IRON AGE

Vol. 161, No. 6 February 5, 1948

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Shadow and Substance

THE statistician looks at the wholesale price index of the Department of Labor. The housewife looks at the price of butter, beefsteak and baby sitters. The steel executive looks at wages, scrap, transportation and fuel. They have all gone up. It is an easy matter, therefore, to speak of high prices as inflation, to identify the end results as the substance of the problem.

Nothing in holy writ bars the term "inflation" as a description of high prices. In the physical field, the term does describe expansion, particularly where the force is air or gas. It is, therefore, an apt and ready tag to apply to dollar butter or three dollar wheat.

Our trouble begins and confusion is compounded when we try to do something about it. Description, diagnosis and prescription are three distinct functions of medical practice. Symptoms make diagnosis possible, and both together determine appropriate treatment. However, that treatment must reach the cause. The great fallacy of price control is that it touches only symptoms.

No doctor will prescribe a noose or a gag for a cough, although both would be "effective" treatments. Price control, as proposed by the interventionists, is on all fours with a fever treatment that places the patient in an icebox. It reaches for the outer symptom of the disease and in so doing weakens the patient and may ultimately prove fatal.

Our memories here are pathetically short. Markets today bulge with goods. The housewife may not like the price of hamburger or diapers but she can buy all she wants—provided she is willing and has the means. The latter is a problem of choice—her choice—and not that of an administrator in Washington. The degree of inconvenience to which she will submit is exclusively her decision. No distant functionary has the authority to say that she may buy only six ounces of fat per week or two pairs of stockings per year. The shelves are filled. The choice—a free choice—is entirely her own.

Have we so soon forgotten the OPA and its volumes of conflicting regulations, with tardy decisions by incompetent officials, with black markets, with ugly corruption and intolerable market chaos? Have we forgotten so soon that the state cannot force men to work and that a mistaken or angled price decision may stifle production? Is it necessary to recall the refusal of ranchers at the end of the OPA period to send their cattle to market and the proposal of the New York City Council that the government seize their property by force?

At a time when the whole world is desperately in need of more food, more clothing, more raw material and industrial equipment, no deliberate design could retard production more effectively than price control. There is impressive evidence in Europe today that the authentic cause of its current crisis is not the destruction of war or threat of Communism, but the misguided zeal of socialist governments which know what their citizens ought to eat and wear and produce; who know what a fair price is better than any open market; who are determined to preserve liberty even at the cost of putting every citizen in jail.

Joseph Stagg Lawrence

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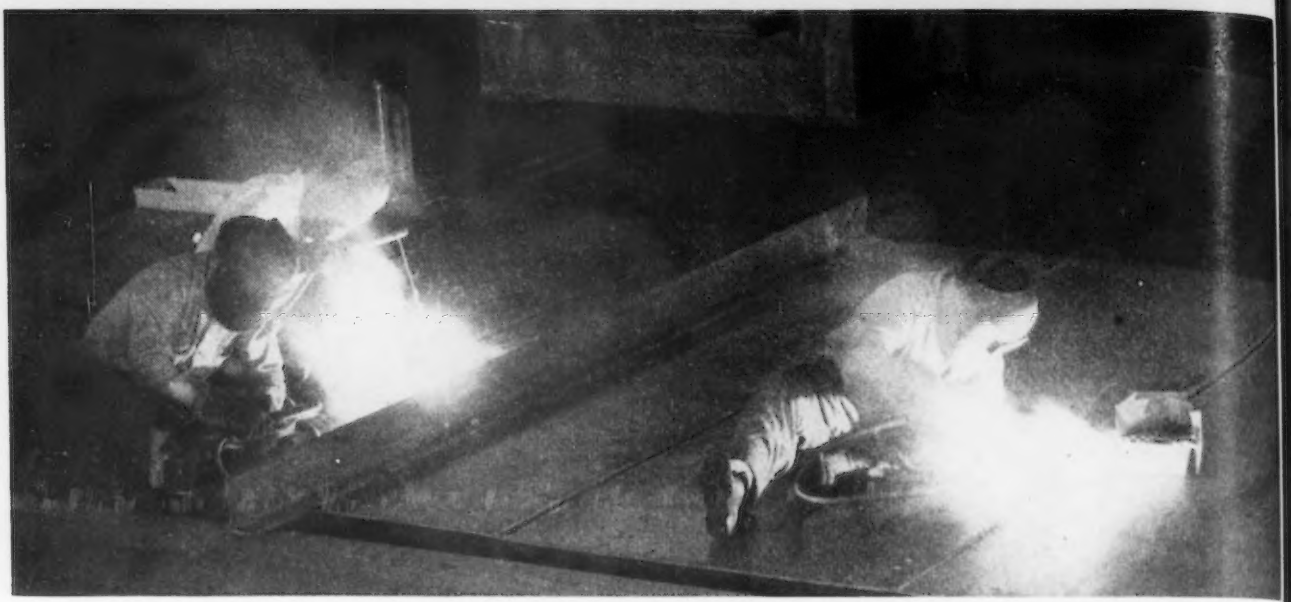

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► Supersonic testing methods are being used to inspect forgings for coal-burning gas-turbine locomotives now under construction. The effect of foreign material in the fluid stream of the gas turbine makes it possible to quite accurately predict rate of wear under specific foreign matter flow conditions.

► Many factors making for good steel earnings last year were supported entirely by demand being ahead of supply. When the tide changes most of the things such as price increases, extra increases, withdrawal from markets to save freight, concentrating on good profit items and picking and choosing business will be out the window. Then steel management will face the supreme test.

► Under an agreement concluded between the Western German steel industry and the bizonal economic authority Britain will receive 100,000 tons of German scrap in the first quarter of this year.

► It sounds fantastic, but a survey recently made by the National Assn. of Home Builders of the U. S. discloses that 17 pct of those replying report nail supply "plentiful." But 40 pct said nails were "very scarce" and 43 pct called them "scarce." Distribution may be the answer.

► Although all predictions about high compression engines for automobiles are subject to qualification because of the fuel oil shortage, the latest prediction is that new models, to be introduced late in 1948, may have compression ratios ranging up to 7.75 to 1. This would require 88 octane gasoline. A year later ratios may be boosted to around 9 to 1 with a resulting increase in octane requirement to 93.

► At the time a columnist said that B. F. Fairless and Philip Murray were graciously dining at the William Penn Hotel in Pittsburgh and had arrived at a commitment of $4 a week pay increase, Mr. Fairless was dining in New York and Mr. Murray was aboard a Washington-bound train. No commitment has been made by either party——yet. The report was just a little ahead of schedule and it doesn't take a dinner for those two friends to reach "an understanding of the minds."

► Service life of switch plates for fractional hp motors has been lengthened by coating the "skillets" with porcelain enamel. The enameled plates also result in smoother operation of the motors.

► The 3-stand cold-reduction steel mill which is to be built at Margam, Port Talbot, for the Steel Co. of Wales Ltd., will roll coils up to 30,000 lb, up to 72 in. wide and down to 0.026 in. thick. Maximum finishing speed will be 2000 fpm. The hot reduced coils will be brought from the strip mill to the cold-reduction plant by twin cooling conveyors 1000 ft long.

► A recent 10-year study of vehicle operation covering 90 million miles discloses that 34 pct of unit delays are occasioned by difficulties with electrical systems, 12 pct by engine troubles and 10 pct by fuel system failures.

► Engineers in U. S. Steel have frightened management with their figures on the present cost of a completely integrated steel mill--ore to finished steel. The figure stands at $300 a ton, almost three times what it used to be. A 10 pct increase in capacity according to these figures---if it were made all along the line---would cost almost as much as the invested capital of the whole industry. The figure may be too high but it is as good as the next one.

► Limestone output is the latest concern in Britain where a catastrophic drop in output, with serious repercussions in the steel industry, is expected unless more labor is made available quickly.

► A steam turbine generating unit to operate at probably the highest steam pressure (1400 psig) ever used in industry will be installed by a refinery early in 1948. With the unit will be a complete water conditioning system with a total flow capacity of 160,000 gal per hr.

► The Indian government, facing a serious problem in forged currency, is considering ordering several million magnets from England. These magnets will be issued to laborers in India and Pakistan to be carried around their necks on a string enabling them to quickly check the legitimacy of the coins. The magnet is intended to replace the usual biting technique.

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Mechanization Speeds

FOUNDRYMEN who face difficult labor conditions and who yet must keep costs at a minimum without sacrifice in quality may well find much food for thought in an ultra modern layout such as is now in operation at the malleable iron foundry of Auto Specialties Mfg. Co., St. Joseph, Mich. Although the building is not new and some portions of the overall equipment were employed for steel casting production during the war, a large proportion of the equipment is entirely new, and everything considered essential for comfortable and highly efficient operation has been incorporated in the new layout.

Of prime importance is the improvement in working conditions, for they spell the difference between working in dirt and discomfort as against doing the job in a clean atmosphere, free of dust and with ample ventilation. This insures as high a degree of bodily comfort as is readily attainable in foundry work. Virtually all factors productive of dust are kept under control and, where dust cannot be prevented, it is drawn off as produced.

Fresh air is washed, cooled and fed in where needed in large enough volume to maintain working atmospheres comparable to that in plants where dust is not a problem. Much of the air moved is drawn over hot molds and castings on its way to exhaust fans and thus helps to cool castings rapidly.

With such arrangements, personnel problems are simplified, labor turnover is reduced and improved efficiency is reflected in a high output per manhour. This output is augmented by the excellent system of handling materials. Something close to the ultimate in labor economy for charging cupolas is attained, for example, as this job is handled by three men, although about 22 tons per hr are melted.

Not only is labor reduced to a practical minimum but, by the use of automatic controls and close technical supervision, quality is kept high and the chance of imperfect castings and of those which do not meet exacting specifications are held at a low level. Uniformity is promoted by employing a 40-ton electric furnace for duplexing metal fed by 5-ton ladles.

By keeping 20 to 30 tons of metal in the electric furnace, the addition of 5 tons of cupola metal from the transfer ladle is limited in its effect on either the temperature or composition of the metal being poured. In other words, by keeping a large pool of molten metal on hand, there is ample time to make alterations to the

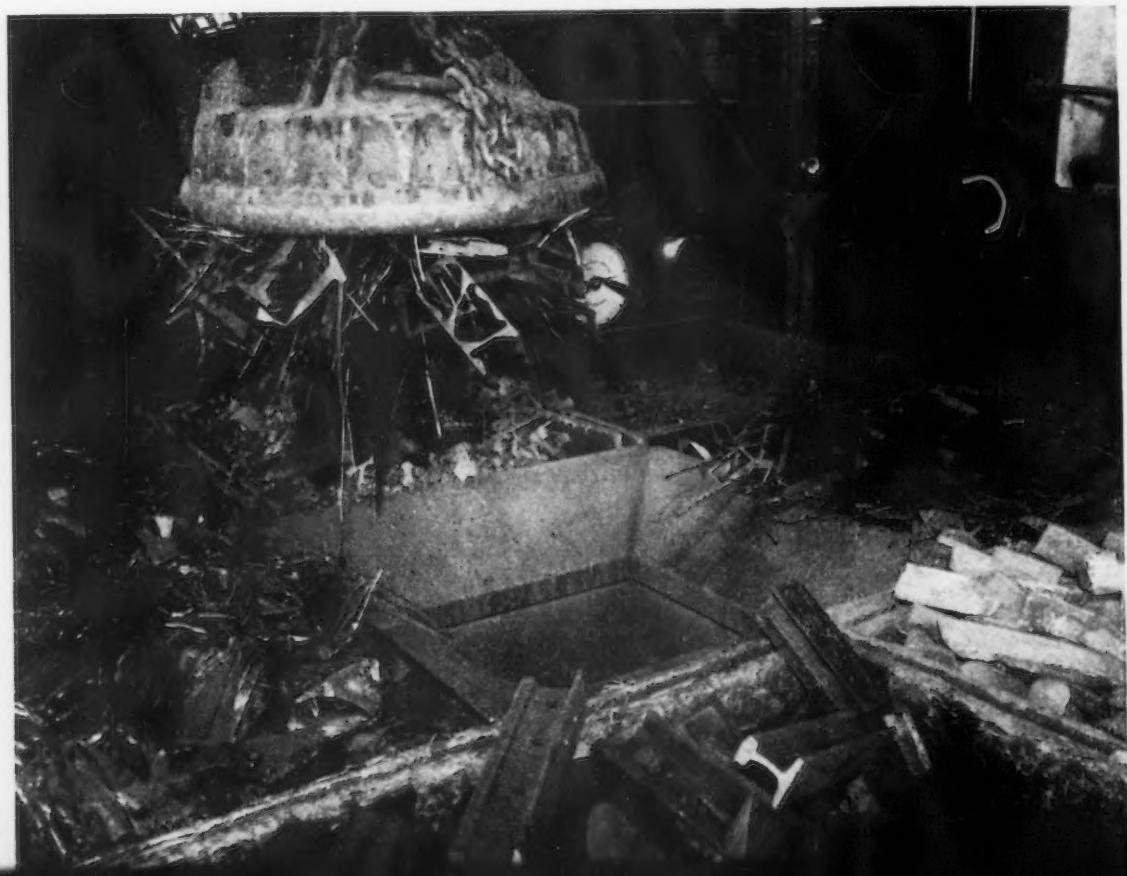

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FIG. 1 — Loading platform and magnet crane discharging a scrap charge into a central weigh hopper. Makeup bins surround the hopper.

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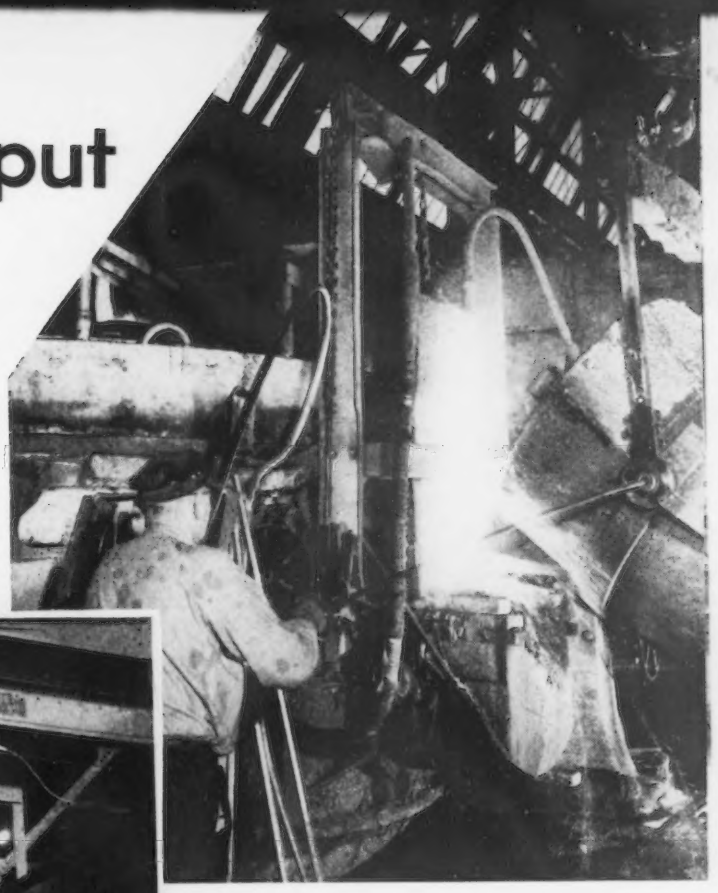
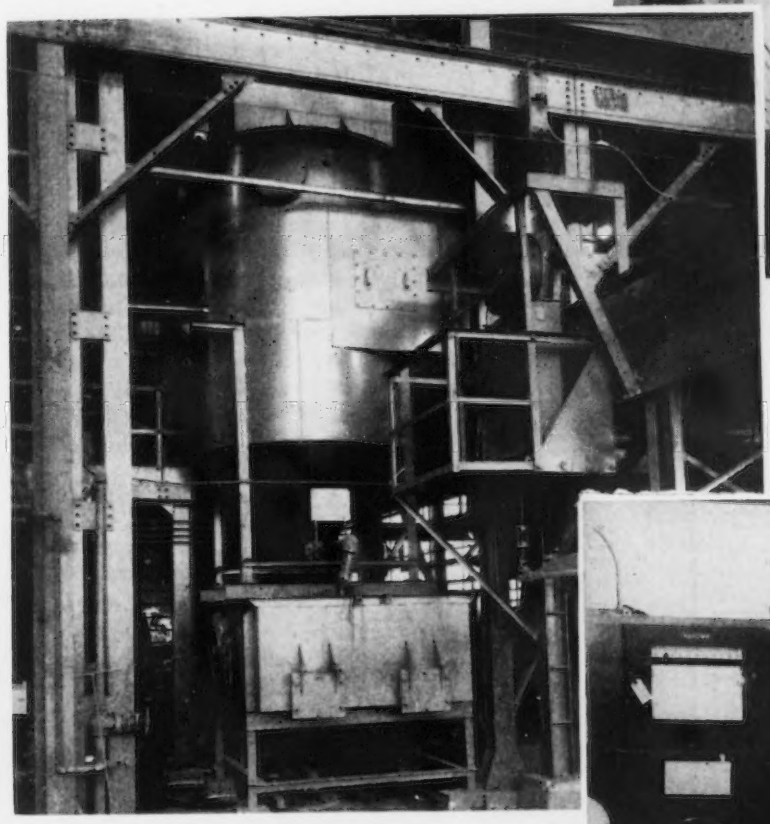
Malleable Output

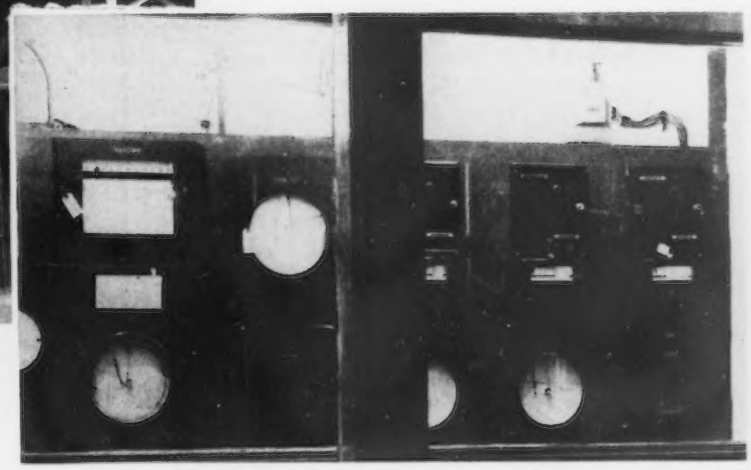
By H. LYON DAY
Metallurgical Engineer,
Auto Specialties Mfg. Co.,
St. Joseph, Mich.



BELOW
FIG. 2—Wet dust collector which draws dust away from the cupola charging area.



ABOVE
FIG. 3—Hot metal from the cupola being discharged into a 40-ton electric arc furnace.



RIGHT
FIG. 1a—This enclosed panel of recording instruments provides an accurate, continuous record of factors affecting melting operations.

cupola metal before the chemistry of the electric furnace metal can drift beyond the limits of satisfactory composition. It is obvious that 15-min ladle additions of cupola metal can exert only an insignificant effect on the metal being poured. Reasons for other economies become apparent as the overall setup is described in some detail.

Two duplicate cupolas are used, one each alternate day consisting of two 8-hr shifts. At the end of the second shift, the charge is dumped and the cupola is left to cool so that it can be repaired while the other is in use the following day. Cupolas are No. 9½ Whiting type, of 60-in. diam, water jacketed and arranged for Griffin hot blast. The cupolas also have Kathabar control of moisture content. In this system, hot combustible gases that otherwise would escape up the stack are used to preheat the blast. This makes, of course, for fuel economy and for faster melting, the latter being continuous. A dry dust collector constitutes part of the hot blast sytem.

With the Kathabar system, moisture content

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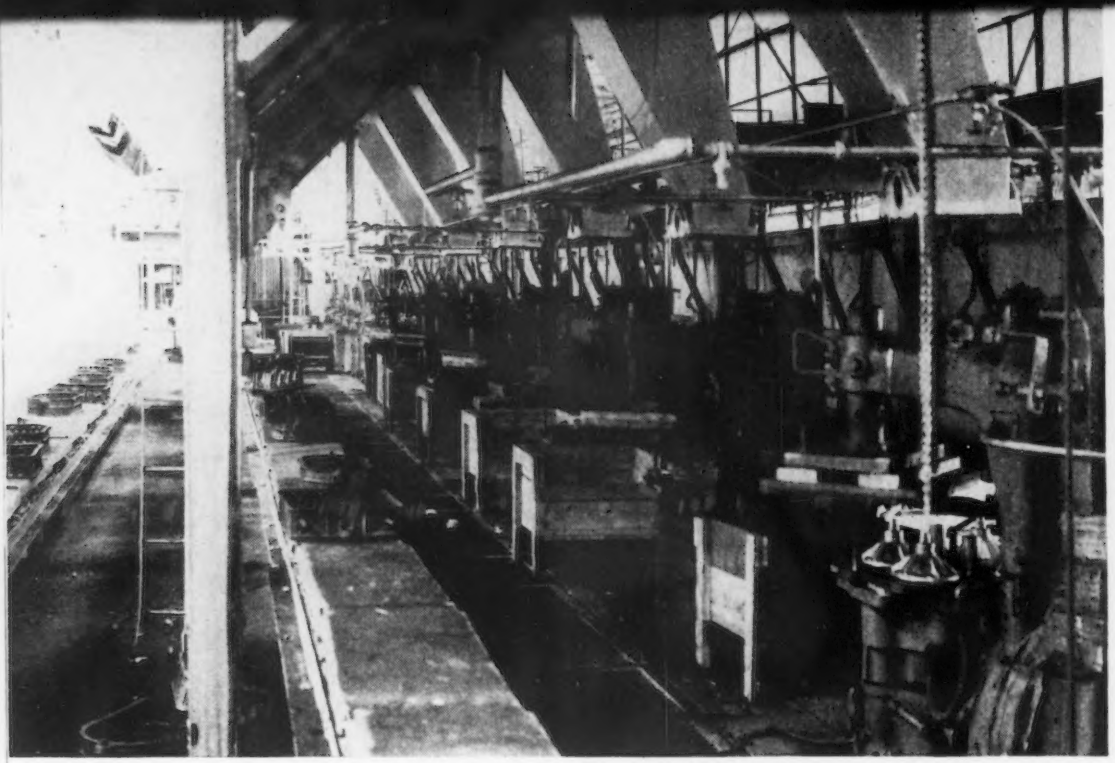

FIG. 4—One of the three molding lines and two of the mold conveyers.

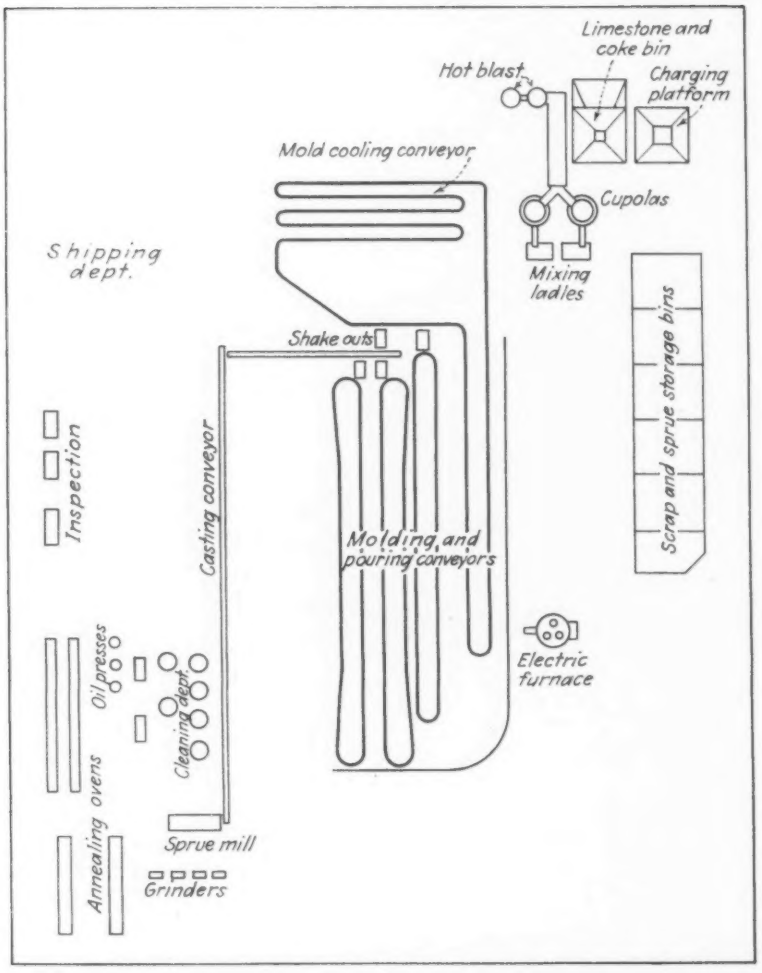

FIG. 4a—General layout of the Auto Specialties malleable foundry showing the relative locations of the various processing departments.

of the air is held constant throughout the year and the volume of air fed, as well as its temperature, is held constant by automatic means. Control of moisture makes castings more responsive to the annealing treatment that gives them their malleable qualities. A set of recording instruments in a room near the cupolas (fig. 1a) provides a continuous record of significant performance factors and indicates at a glance when adjustments are required.

Methods of preparing the charge are also noteworthy partly because of the mechanical equipment employed to minimize labor. Incoming cars of coke, limestone, pig and scrap are unloaded by crane and are all stored under cover. A specially processed slow burning Southern coke is used. Coke and stone are stored in large elevated bins equipped with hydraulic gates and weigh hoppers adjacent to the iron loading platform which is served by a charging crane.

Pig iron and scrap are stored in bins at floor level from which they are transferred by a magnet handling crane to the charge platform, as shown in fig. 1, at the center of which is a weigh hopper whose gate is under hydraulic control. This hopper holds a full metal charge and is surrounded by secondary makeup bins for different types

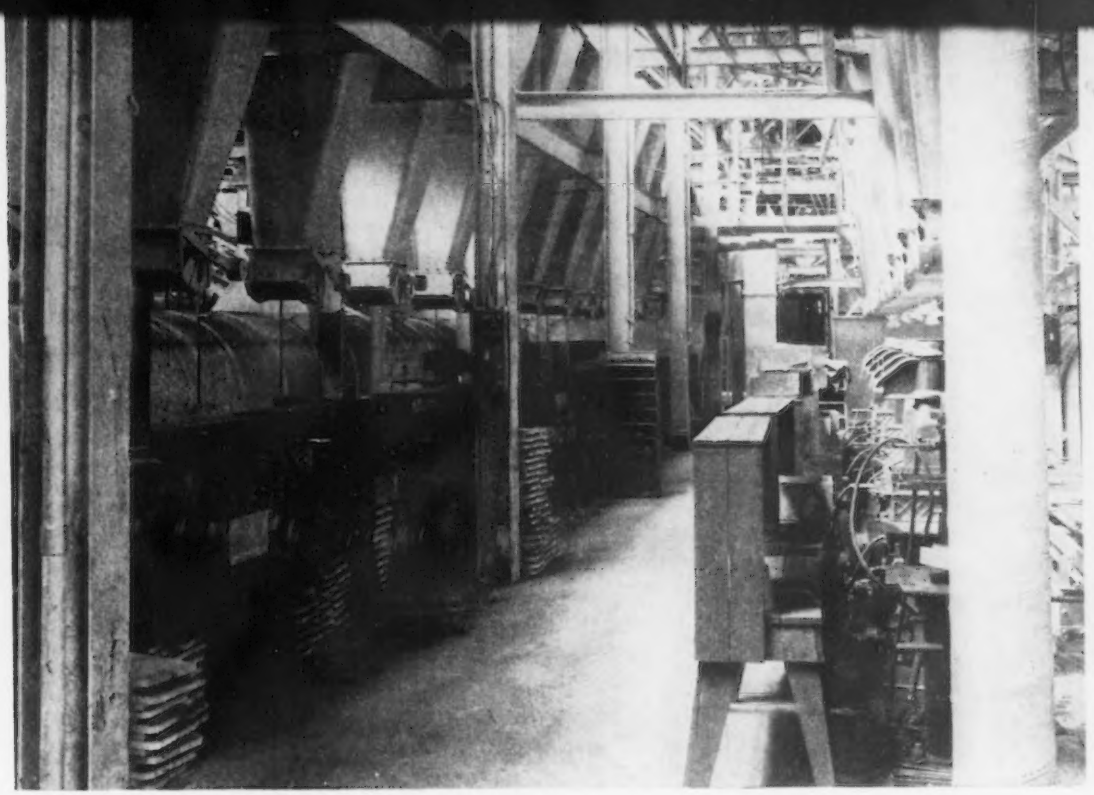

FIG. 5—Overhead sand hoppers supply green sand to the molding line. In the left background is one of the mold cooling tunnels.

of pig and scrap. From the metal compartments are assembled the charge being weighed out by the magnetic crane operator. The metal charge contains approximately 10 pct silvery pig, 40 pct scrap and 50 pct sprue. A coke-to-metal ratio varying between the limits of 8 and 11 to 1 is maintained.

Total charges are made up in cone-bottom buckets set on an electric motor driven transfer car shiftable along a track at floor level. The track runs under the charge platform and the coke and stone bins. After charges are weighed out by the crane operator in the corresponding weigh hoppers, the car operator shifts the charging bucket to receive these charges, pulls the release levers of the hydraulically operated gates and then runs the car to a point where the loaded bucket is picked up by the charging crane, hoisted to dumping height and shifted over the cupola. There the cone bottom bucket is dumped, picked up again and then is lowered onto the car.

By having a cone-bottom bucket, the charge is spread evenly, next to cupola walls. As soon as weigh hoppers are discharged and their gates are closed, the magnetic crane operator starts assembling the next charge. Thus, all charging is done by three men; two crane operators and a transfer car operator.

Considerable dust is released as a charge is made up and dropped from weigh hoppers, but this dust is drawn off as produced by a Whiting Hydro-Clone wet suppressor, shown in fig. 2, adjacent to the loading area. The fine dust is wet down just before air is discharged outside the building. This not only keeps the charging area comparatively free of dust but prevents it from being drawn back with air used for ventilating other areas. Water used for dust wetting is discharged in a settling tank from which slurry is removed by truck as required.

Another factor tending to reduce dust formation around cupolas is the use of wet slag disposal. Slag is drawn off continuously at a front spout and runs down a water trough into a quench tank. This produces a granulated slag that is elevated by a bucket conveyer and is dumped, while still wet, for hauling away by truck. This arrangement avoids dust formation by slag. Some dust results from the cupola drop once a day at the end of the second shift, but even this is minimized by using a special drop bucket truck that is run under the cupola and in which the drop is immediately quenched.

Molten iron runs from the cupola in a continuous stream as soon as the new charge, laid and ignited 3 hr in advance of the working day, is up to temperature. Tests with oxygen applied during the warm-up period have indicated that this period could be shortened somewhat but the small time saving that results is not commensurate with costs and extra equipment involved. Conclusions indicate that no significant net benefit would be derived by using oxygen at any stage of melting, especially in view of the economies that result from the use of the hot blast.

Charging is regulated to produce a standard grade of automotive malleable iron having the following nominal composition: 2.65 pct C; 1.50 pct Si; 0.40 pct Mn; 0.10 pct S max; 0.055 pct P max.

The chemistry is checked for each 5 ton ladle transferred to the duplexing furnace, (fig. 3) and charging is altered, if necessary, to compensate for any important deviation from the mean or nominal composition. As 20 to 30 tons of metal are normally held in the duplexing furnace, the addition of a 5-ton ladle of new metal,

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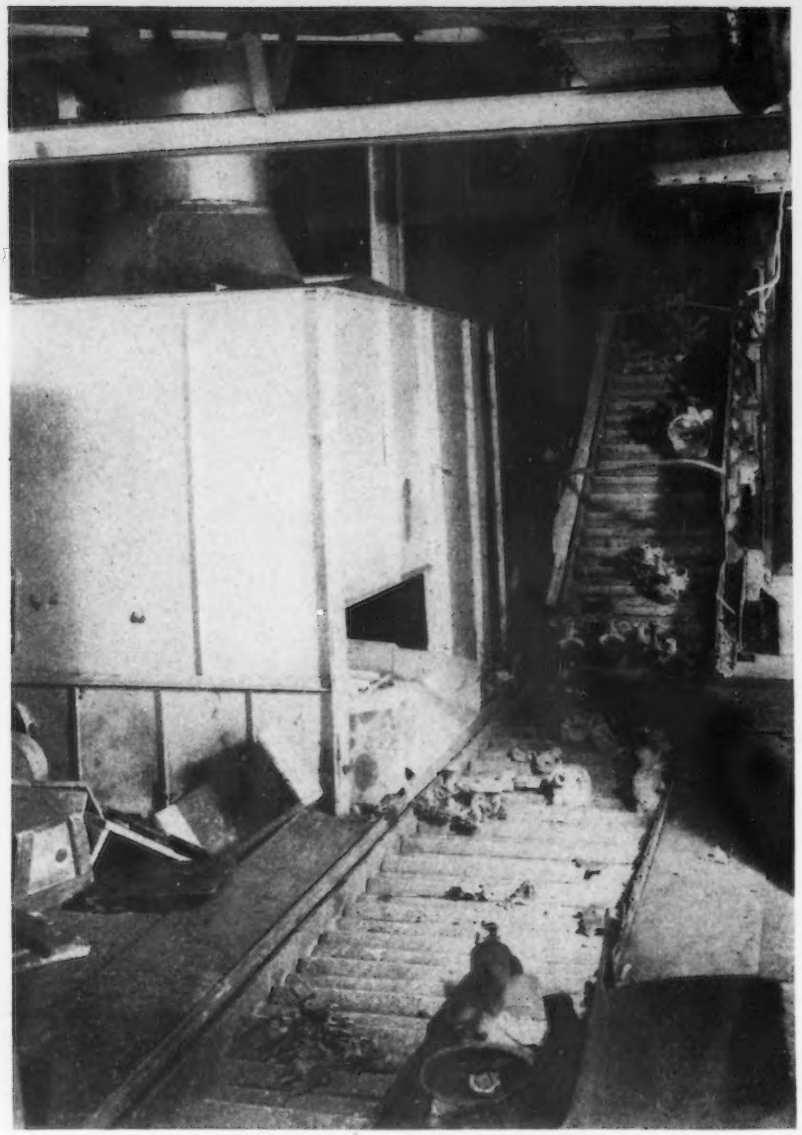

FIG. 6—Castings from the hooded shakeout (left) feed into the hot casting conveyer which carries them through a cooling tunnel.

even if it is slightly off the mean composition, does not produce an important change in the composition of metal drawn from the electric furnace into the hot metal carriers. Before the cupola metal can exert any significant overall effect, the checks on each ladle are finished and any indicated additions or changes in the charging are quickly and accurately made.

Metal run from the cupola is not discharged directly into the transfer ladle but is run into trunnioned mixing ladles that are kept hot by oil firing and receive a desulfurizing agent before tapping into the transfer ladle is done. This ladle is transferred to the electric duplexing furnace by an overhead crane.

From the spout of the latter furnace, the metal is drawn off into a hot metal carrier on a monorail and from this is shifted into drum-type ladles from which pouring into molds on the conveyer lines is done. Drum ladles are also on monorails and are moved by hand as needed to keep pace with the continuously moving molds.

There are three mold conveyers which traverse the lines, shown in fig. 4, on which molds are produced in both vibrator and roll-over type of molding machines. Metal patterns are used and, for large molds, there are two men per machine. They work as a team and develop remarkable proficiency in keeping step with the conveyers onto which cope and drag sections are shifted and assembled so that the molds reach the hot metal stations ready to be poured.

These stations are near U-turns where the molds start back through cooling tunnels from which fans exhaust heated air. As the cooling air is drawn from adjacent molding area, any dust there is sucked off and these areas are well ventilated. A schematic drawing showing the relationship of these conveyers to other parts of the foundry is given in fig. 4a.

As all sand is prepared for use by conventional methods, these need not be described. Sand delivery is through an overhead system, shown in fig. 5, and, being moist, the sand is not productive of dust. Cores are made also by conventional means and, after baking, are shifted on pallets by lift trucks to points along the mold conveyers.

Large molds are handled on slat-type conveyers and smaller molds on trays supported by hooks from chain conveyers. The chain lines loop back and forth through a labyrinth cooling room which is enclosed and well ventilated. As most of the cooling takes place in tunnels, and since cooling rooms having an inward flow of air, relatively little of the heat radiated from cooling metal enters working areas.

As small molds reach the shake out, fig. 6, they are dumped onto the unit automatically. Larger molds are shifted onto shakeouts by air hoists on trolleys. Flasks are returned to the mold conveyers and are shifted back to points needed for reuse.

Shakeout is normally the cause of much dust but in this case each is located under an exhaust hood connected to a powerful exhaust system which draws air in from all sides. This air helps to cool and ventilate surrounding areas and effectively keeps dust and most of the heat away from operators. Air exhausted through the hoods is washed before discharge outside the building.

Sand falling through shakeouts is deposited

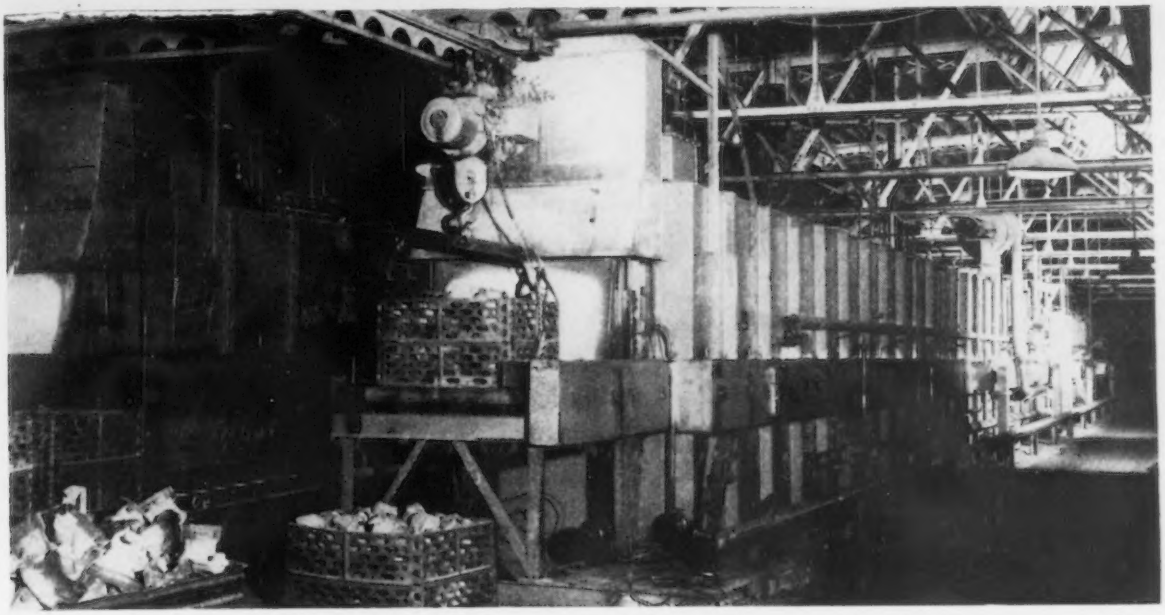

FIG. 7—An electric annealing furnace from the loading end. Basket loads are received from the roller conveyer at left.

on a conveyer that carries it back for reprocessing. Castings are discharged onto an apron conveyer which carries them through a cooling tunnel before they arrive at a sorting area where hand hammers are used to break off sprues and runners and the white iron castings are sorted and visually inspected before being shifted into tote boxes for transfer by fork truck to the heat-treating department. Sprues, runners and rejected castings continue on the conveyer to a dumping point where they are discharged for return to cupolas for remelting.

In preparation for annealing, castings are loaded in trays on roller conveyers that parallel the furnaces. At the ends of these conveyers, the trays are shifted one at a time into the furnaces, as shown in fig. 7, which have roller hearths.

Although each of the four electric furnaces is 130 ft long, the hearth motion is extremely slow, as the cycle requires an average of 30 hr. Charging and delivery are done automatically from roller approach and discharge platforms.

Heating is done rapidly to 1750° F, held for 8 hr, after which the temperature is dropped about 7° per hr to 1390° F. All this is done in a controlled atmosphere of partly burned propane gas which yields a mixture of CO, CO_2 and N free of water vapor. The result is to convert the brittle white iron of the casting to malleable iron without scale formation or change in the chemical composition of the outer layer of the casting.

The furnaces each have ten zones, of which both the temperature and the atmosphere are automatically and closely controlled as indicated by recording instruments of which there is a large panel for each furnace. In the final zone, there are cooling coils which reduce the temperature to 700° F at which the castings are discharged black and ready for such straightening as may be required.

With each batch of castings, standard test samples are cast and these are put through the annealing furnaces along with the castings and are subsequently broken to permit examination of the fractures. Quality and the efficacy of heat-treatment are judged largely by the appearance of the fractures and data as to hardness and elongation obtained from the test samples. As records of each heat and batch are prepared (including charts made from recording instruments from each heating zone of the furnaces), there is ample evidence as to the degree of uniformity secured. If a significant lack of uniformity is discovered, the reason for the variation is easily determined and a suitable remedy is applied.

Strain Gages Used in Ingot Mold Research

STRAIN gages have been applied to the measurement of strain in ingot molds during and immediately after casting. The work is to provide data from which the stresses produced in the mold on teeming can be calculated and, it is hoped, will lead ultimately to elimination of major cracking of the molds.

The tests are part of a research program being carried out under the supervision of the British Iron and Steel Assn., and in operation a unit simultaneously records both thermocouple and strain gage readings, from which strain as a function of temperature in the mold surface can be determined. To permit calculation of stresses from the data obtained an investigation of the properties of the mold iron at room and elevated temperatures has been carried out. Stress-strain and other tensile properties have been examined and the coefficient of linear expansion and Poisson's ratio for the mold iron have been determined.

The strain gages being used are said to have an accuracy of ± 0.0002 in. for a 5-in. long gage.

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Copper-Bar

By F. W. MYERS
Welding Engineer, Cambridge, Mass.

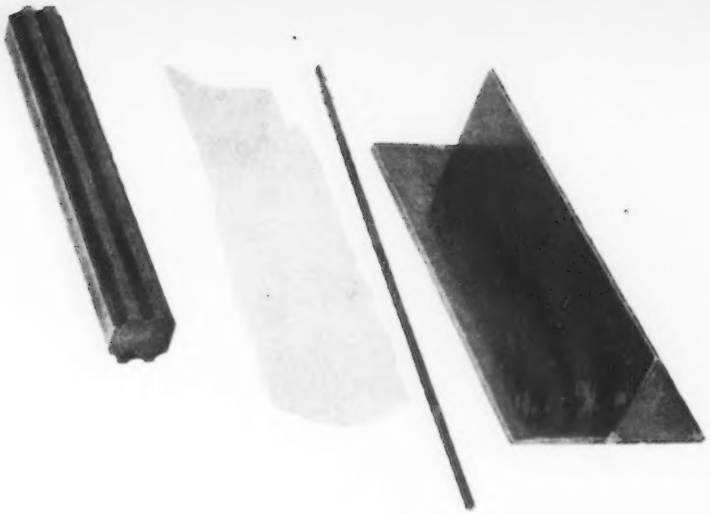

FIG. 1—To make a fillet weld in the T-joint shown at right by the copper-bar method, a grooved copper bar, paper insulation, and an electrode provide the setup material.

A German development called the Elin-Hafergut or copper-bar arc welding technique, has certain advantages in welding speed and weld appearance but physical characteristics of the weld are somewhat lower than by manual. The method is described in this article and its merits and disadvantages are discussed.

THE rapid development of welding processes in the past decade resulted in the welding industry finding itself acutely short of expert welding operators during World War II. The importance of the thoroughly qualified welding specialists became obvious during this time and the difficulty of obtaining the necessary number of fully qualified welding operators naturally resulted in a trend toward greater mechanization of the welding operation whenever and wherever possible.

A considerable number of welding machines, as well as a number of automatic and semiautomatic procedures have been developed to the point of practical application in many cases. The unquestionable advantages of fully automatic welding machines in welded fabrication are somewhat offset by considerable initial expense for the equipment; the special jigs, fixtures and other accessories; and the necessity of careful preparation of the seam to be welded. Comparison of automatic and manual welding has proved without question, however, that the fully automatic welding processes have a much higher performance rate, as far as quality and quantity of weld metal deposition are concerned, and there is far less operator fatigue.

In Germany, during the war, a semiautomatic procedure was developed which requires no special training in welding technique and only moderate initial expense, as far as material necessary for the operation is concerned.

The copper-bar, or Elin-Hafergut technique is a process of semiautomatic welding in which the welding operation, once started, continues automatically. This technique was introduced by its inventor, George Hafergut, at a technical meeting in Stuttgart in 1939. Since then, descriptions of the method have been published in various German technical publications. As this process can be considered a German wartime development, there exists in this country very little information concerning it.

For many years it has been known that it is possible to place an electrode on a welding seam, then to contact its bare end with the source of current, complete the circuit, and the electrode will melt automatically along the weld seam. This technique of semiautomatic welding found no practical application, however, the results being very poor. The electrode warps and the core wire is subjected to excessive ohms heating. In addition, the electrode does not stay on the seam and raises itself from its proper relative position. Also, if the current used is too low, the electrode will short and stick to the base plate.

In the copper-bar process, the welding electrode is placed flat on the seam of a butt or fillet weld and is covered with a copper bar provided with a groove that incloses and shields the electrode from the atmosphere. Paper can be placed between the welding electrode and the base plates as well as between the electrode and the covering copper bar. The setup for the copper-bar arc-welding process is shown in figs. 1 and 2, and diagramatically in fig. 3.

The copper bar keeps the electrode lying cor-

Semiautomatic Welding • • •

rectly throughout the entire length of the weld seam and prevents any movement of the electrode. The paper serves as insulation between the base plate and the copper bar and in burning absorbs any oxygen present in the groove. Thus, the atmosphere in the groove is made non-oxidizing, which tends to improve the metallurgical qualities of the weld metal, as shown in fig. 4. The paper also fills any spaces between the copper bar or the base plate and the electrode.

Melting the electrode within a more or less closed channel gives a rather uniformly regulated and controlled arc stream, which in turn results in a constant deposition rate. Electrode spattering is prevented by the covering bar and the pressure of the bar firmly holds the electrode in place, thus maintaining a very steady arc. Deposition takes place under ideal conditions, resulting in a weld appearance which is difficult to obtain by manual operation even with skilled welders. A sample of such a weld is shown in fig. 5.

The copper bar must always be in its correct position relative to the base plates, holding the electrode firmly in the center of the welding groove or seam. A small free space should be left at each side between the electrode and the copper bar so that the slag may float freely to

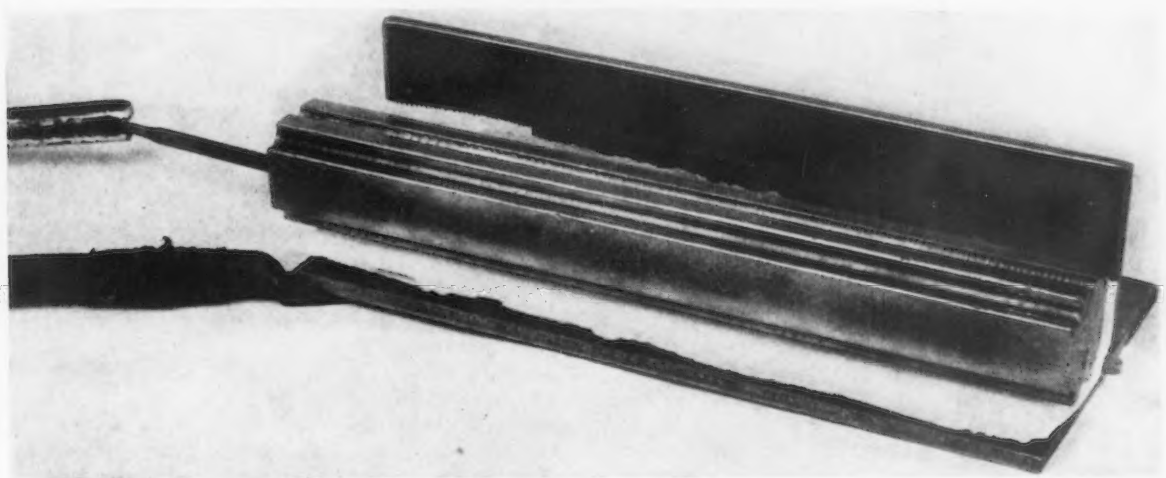

FIG. 2—The paper acts as an insulator and consumes the oxygen in the bar enclosed area around the electrode, thus giving a non-oxidizing atmosphere around the weld. This view shows the various components in position ready to proceed with the welding.

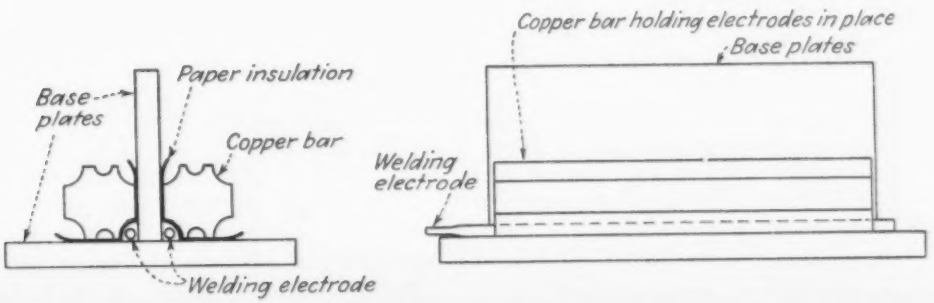

FIG. 3—This sketch of the copper-bar electric arcwelding process shows how a double weld can be made simultaneously in a T-joint.

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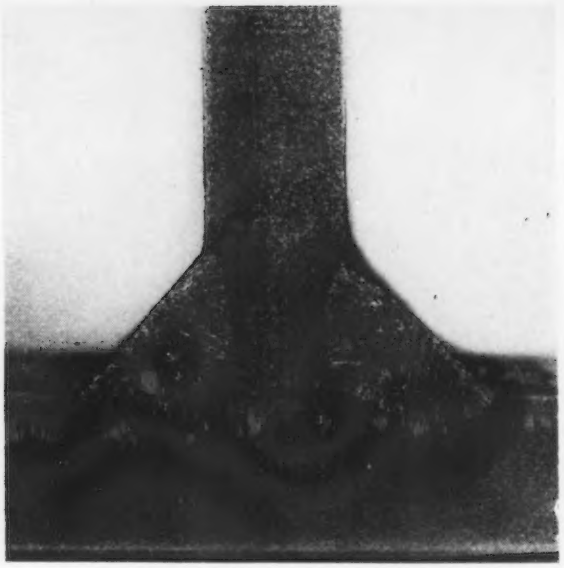

FIG. 4—Weld quality by the copper-bar method is relatively good. In this macroetched double-fillet weld, the right fillet weld was made at 170 amp and 23 v, while the fillet weld on the left was made at 180 amp and 21 v.

the same current values as those used for manual welding with the various commercial types of electrodes, usually averaging to 20 amp less.

In addition to these factors, the main advantage of this new method seems to lie in its economy. An unskilled operator can perform all the operations required, if given the proper electrode, copper bar and correct current setting. Where long welds are required in structural members, an unskilled operator theoretically should be able to make simultaneously two to four welds when supplied with proper jigging and clamping equipment.

As is shown by fig. 2, the electrode is covered with paper and connected at the bare end to the electrode holder. It is then short circuited by striking a metal wire or carbon rod on the free end of the electrode. While the weld is being made, the operator is free to prepare new joints and electrode setups on a regular production line basis. It is possible that in production welding, cooling of the copper splints would be advisable. This can be done by dipping them in water after each weld, or, by drilling a hole through the center of the copper bar and connecting a water line to the bar so that a constant stream of cool water flows through the bar.

In special applications, which do not require welds which will meet X-ray standards, an unskilled operator possibly can do as much welding as three or four highly skilled men specializing in hand arc welding. This results from the fact that several welds can be made simultaneously and continuously when special production jigs and fixtures are provided.

Various materials have been tried for the bar covering the electrodes, such as wood, treated wood, plastic, glass, etc., but copper has proved to give the best all-around results for the covering bar.

In Germany, various welding experts felt that this procedure could acquire considerable practical importance. Naturally, numerous questions have arisen in this country as to what conditions would be necessary to obtain perfectly welded joints. Among other questions arising were those relating to the use of various types of electrodes, and as to whether the welds made by means of this process are as good or better than those made manually by experienced and careful production welders.

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FIG. 5—The appearance of a weld made by this process is good. This 12 in. fillet weld (plate thickness, 3/16-in.) was made in 1 min, 33 sec, at 172 amp and 22 v.

the surface of the weld, since this material increases in volume as the electrode is melted. Should the groove in the copper bar be too small, it is quite probable that the slag will cause pockmarks and other defects in the weld. The relative sizes of the groove and the electrode can be seen in fig. 3.

This process generally permits the use of electrodes of any length. According to German reports, electrodes of 3 to 15 ft have been used successfully. In laboratory tests conducted in this country, 14 and 18-in. electrodes of 3/16 and ¼-in. diam have been used successfully on welds up to 6-ft long. A 5 ft 10 in. weld made in this manner is shown in fig. 6. The only limitation on weld length will be the amount of electrode heating that will take place at the point where the current is introduced.

Various tests and experiments have shown that the majority of heavily coated electrodes commercially available can be used successfully. Even high-strength electrodes and alloy electrodes may be used fairly successfully by this process. The copper-bar welding operation is performed with the same polarity and nearly

In addition, the problem arises as to whether or not this copper-bar procedure requires particularly elaborate preparations and if the most appropriate current values lie within narrow limits. Numerous and extensive experiments have been undertaken which were intended to answer the following questions.

1. **What are the mechanical properties of copper-bar welds, ascertained from the usual tensile tests and tension impact tests made in conformity with best possible practice?**
2. **What changes occur in their properties when the current values are increased or decreased?**
3. **What are the metallurgical properties of the welds?**
4. **Is it possible to make fillet welds on heavy steel sections with the copper-bar process?**
5. **Do the welds made by the copper-bar process compare favorably both in tension and impact properties to those made by the manual metal-arc process?**
6. **What are the metallurgical and mechanical property changes that occur when alternating current is used instead of direct current?**

RIGHT

FIG. 7—The lack of peneration of the weld in this 1/4-in. plate is evident. The copper-bar technique process is more adaptable to welding stock 3/16-in. thick and under.

o o o

The experimental tests conducted on this process in the United States show that the copper-bar, or Elin-Hafergut, welding method generally produces welds which may be termed acceptable where quality standards requiring a high degree of soundness are not paramount. Butt welds made by this method on steel plate 3/16-in. thick and over do not have the penetration required to meet high quality soundness standards, as shown in fig. 7. On plate thickness of less than 3/16-in., complete penetration can be obtained by the use of proper techniques with suitable jigs and fixtures as shown in fig. 8. Fillet welds with adequate penetration to meet good soundness standards can be obtained in the flat position only. The fact that this copper-bar welding method does not produce fillet welds free from porosity and with complete penetration at the root of the weld with certain types of electrodes does not prohibit its use where high quality soundness standards are not required or can be waived for excellent physical appearance standards.

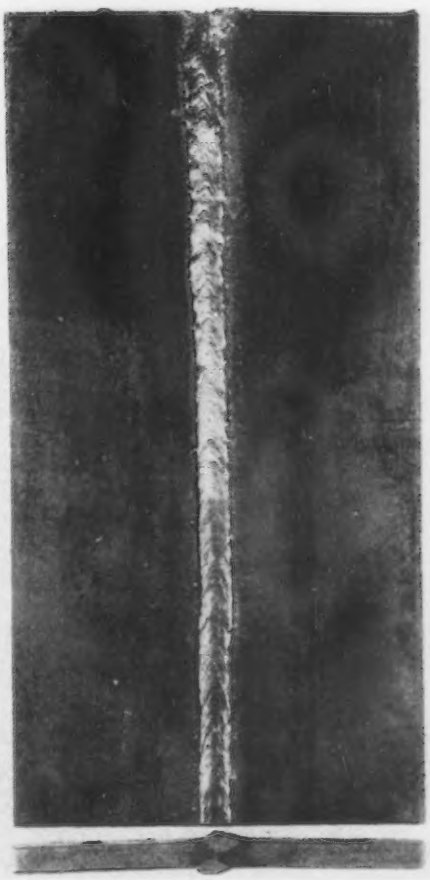
Single pass fillet welds produced by this copper-bar method in the flat position appear smooth and are uniform in size and cross section. In other than a flat position, it has not been found possible to control adequately size and contour as well as the slight tendency to undercut on the vertical leg of the fillet, particularly when the weld is in the horizontal position.

Single pass butt welds of minimum reinforcement and penetration were not obtained in any of the tests conducted in the United States during the investigation of this welding method.

It is considered that this copper-bar welding method provides the opportunity of accomplishing semiautomatic operation without the need of expensive automatic welding equipment. For some types of general weldment production it is possible, with proper jigs and fixtures, to

ABOVE

FIG. 6—This 5 ft. 10 in., fillet weld in 3/16-in. stock was made at 175 amp and 26 v in 8 min 29 sec by the copper-bar method.



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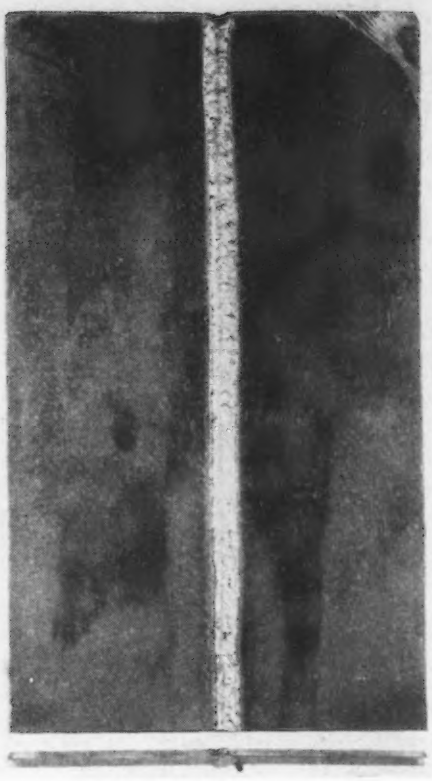

FIG. 8—Using thinner stock, 3/16 in. or less, weld penetration is good and the weld finish appears to be better than that generally obtainable by manual arcwelding.

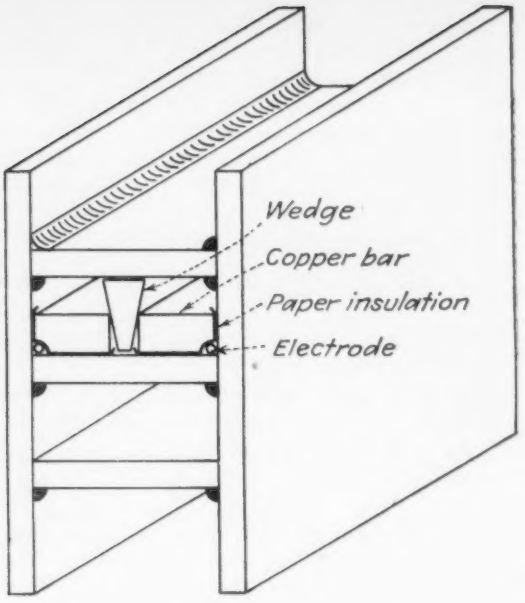

FIG. 9—The adaptability of the copper-bar arc-welding method to such jobs as illustrated here, where it would be extremely difficult to make this fillet weld manually, enhances its use.

o o o

obtain relatively high weld metal deposition with an unskilled operator. Also, as shown in fig. 9, the copper-bar technique is adaptable to fillet welds that are otherwise inaccessible or difficult to get at by manual arc welding. Theoretically, by this method, it appears possible to increase the production efficiency of manual metal-arc welding by 25 to 30. It is quite apparent that long straight single pass welds of a repetitive type are desirable for optimum results.

It is considered that multiple pass welds are not, from the economic standpoint, adaptable to this method of welding. The shape and size of the copper bar must be different for each pass required, which thereby necessitates a different setup for each pass to be made. This is not conducive to high production.

Using direct current with this copper-bar method, single pass fillet welds of the same size and contour as fillet welds made by the manual metal-arc method show a tensile strength slightly less than the latter. The tension impact values are slightly lower than those of welds made manually. This may be attributed to the differences in degree of penetration of the welds and the higher energies used with the latter method. When comparable alternating current values are used, the welds made with the copper-bar method are somewhat superior in strength.

The following summarized limitations of the copper-bar method should be recognized:

(1) Size of weld deposit is controlled by size of electrode used.

(2) Multiple pass welds for production work are not considered to be practicable.

(3) Magnetic arc-blow sometimes is difficult to overcome when using direct current.

(4) Penetration required to pass X-ray standards is not usually obtained in butt and fillet welds on plates 3/16-in. and over in thickness.

(5) Class E-6010 electrodes cannot be used successfully by this method.

(6) Straight runs of a repetitive nature are considered necessary to obtain economy in production costs.

The Elin-Hafergut or copper-bar arc welding procedure has been patented in Germany and the United States. The United States patent number is 2,269,369, and it is understood that all alien patents now are in the hands of the Alien Property Custodian and are available for use by American industry on a royalty-free basis.

Unusual Shakeout Arrangement Speeds Sand Conditioning

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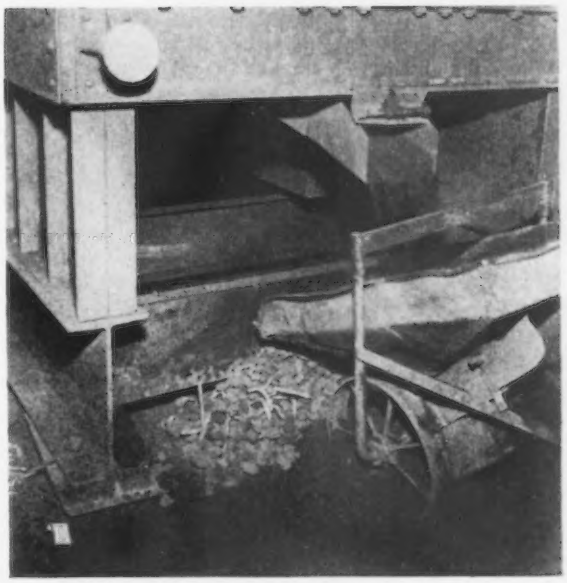

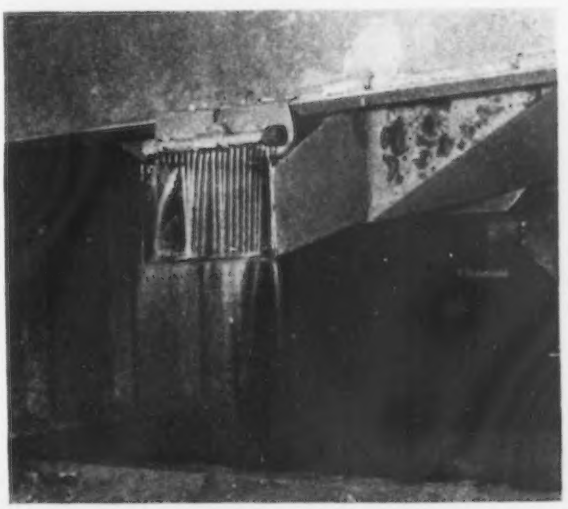

AN unusual shakeout arrangement, in which sand from a mechanical shakeout unit is fed directly into a Screenerator which deposits it, conditioned, into a heap available for re-use, is shown in the accompanying illustrations.

The shakeout is a Robins Floatex unit with a collecting hopper and discharge spout integrally attached to the vibrated live frame for concentrating the sand passing through the deck and discharging it at one point. This discharge is located in the center of the side of the shakeout opposite the drive and is used for feeding the sand directly into the sand conditioner.

In this installation, which is used for handling cast truck flywheels, the Beardsley & Piper Screenerator is located opposite the molding floor and the shakeout unit is located adjacent to it as shown in top illustration. The flasks, filled with sand, are then put on the shakeout deck and the sand passes through the perforations, is fed onto the Screenerator (center illustration), which, after removing lumps and small pieces of metal, slings the sand onto the heap. The entire shakeout operation in this case takes about 30 sec. In order to temper the sand properly before it is aerated, a spray pipe, shown in lower photograph, was installed on the base of the shakeout, feeding streams of water onto the sand as it it discharged out of the spout, the volume of water being regulated by the hand valve. An operator experienced in cutting sand can readily determine if the proper amount of moisture is being added by periodically testing the sand after it has passed through the Screenerator.

In this particular installation, the shakeout deck has 2x4-in. openings and the Screenerator has ½-in. mesh. Sand capacities up to 1000 lb per min are handled. The collecting hopper and discharge spout, both being vibrated, prevent the sand from coming out in surges and produce an even flow onto the Screenerator.

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The Induction-

As a means of overcoming the lack of quality coke and also to provide improved melting conditions for the production of high test irons and high carbon alloy steel castings, use of a melting unit which combines the features of a cupola and an electric induction furnace is proposed by E. Piwowarsky of Germany. This article discusses briefly some of the design considerations of such a unit, and construction details of an experimental model are given.

DEVELOPMENT of a melting unit combining the advantages of a cupola with the advantages of the electric-induction furnace has been proposed by E. Piwowarsky as a means to overcome the shortage of high grade coke and to provide a unit capable of more efficiently producing certain types of high test iron which cannot now be handled too well in the cupola.

The induction heated cupola, the result of considerable experimental work done in Germany, was proposed by Dr. Piwowarsky at a foundry meeting held in Aachen, Germany, last year.

While the description given of this furnace appears to ignore a number of practical construction and operating problems, it should have some unusual and highly interesting operating characteristics. A cupola furnace heated by induction (see fig. 1) consists, according to the author's proposal, of the normally constructed upper section of a cupola, operated either with cold or hot blast. The underframe, however, is constructed in the form of a furnace which operates at high or low frequencies. In principle it is necessary that the well of the induction-cupola be, and remain, filled with coke. Alternatively, it is possible to construct the induction furnace as a forehearth, and fill it in accordance with the above-indicated rule with coke or charcoal. This fuel, by means of some suitable weighting device, should be kept, at least partially, underneath the melting zone. In addition, the construction of the induction furnace requires the following:

1—The underframe, or forehearth, heated by induction, should be constructed as a furnace

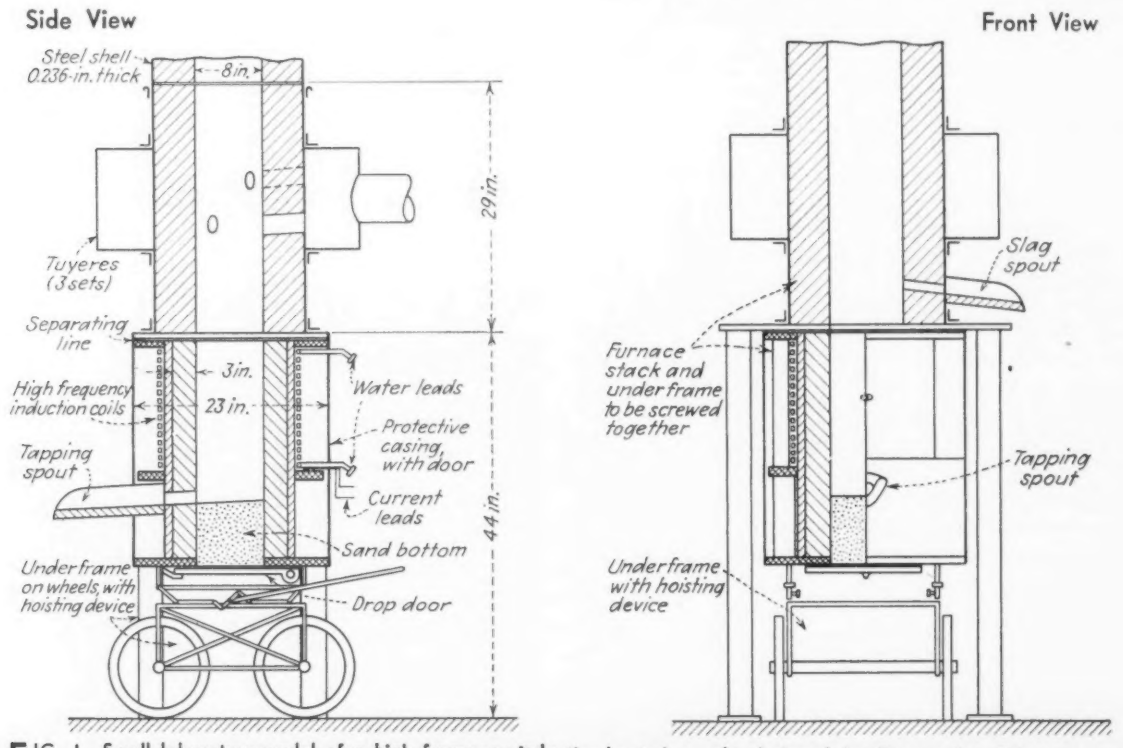

FIG. 1—Small laboratory model of a high frequency induction-heated cupola designed by Piwowarsky. This unit was designed to work on a cold blast volume of 130 to 175 cfm, and has a capacity of 650 lb per hr.

Heated Cupola

provided with a tapping spout for the melted metal.

2—The underframe, heated by induction, must be constructed so that it can easily be disconnected from the melting and preheating area of the cupola, preferably mounted on wheels, or so constructed that it can be raised and lowered.

3—The underframe, heated by induction, should be provided with rammed sand on the bottom of the hearth and with a drop door which can be easily handled. This bottom, however, could be made also from some other refractory material, as corundum, etc., placed on the bottom of the hearth.

The metallurgical advantages of the furnace combination proposed here include the following: The iron, which had been premelted in the cupola, very advantageously as far as the technique of heating is concerned, is delivered without any loss of temperature into the forehearth which is heated by induction. Here it can be superheated at from 200° to 400° F with an energy of only 60 to 120 kw-hr per ton. Also, since the cupola can be heated with small coke charges, the absorption of sulfur by the iron will be kept within moderate limits.

The fluxing action in the induction-heated underframe will clean the coke bed constantly of the accumulating slag and will permit a uniform and fast combination of the carbon with the iron, even when a high percentage of steel is present in the alloy. The intensive fluxing, which, owing to the coke with which the underframe is charged, is exposed to a very strong whirling, will be beneficial in purifying the melted iron and in cleaning it of gases.

By charging the induction-heated underframe partially or wholly with highly refractory fragments, as for instance with round pieces of corundum, the absorption of carbon can be kept within certain limits or can be totally avoided. By thus combining the furnaces, it will therefore in all probability be possible to melt alloys with a low carbon-content, up to the mixtures of salable tool steels and steel castings containing a high carbon content.

The underframe of the furnace can be constructed, according to Dr. Piwowarsky, so as to operate either on high or low frequencies.

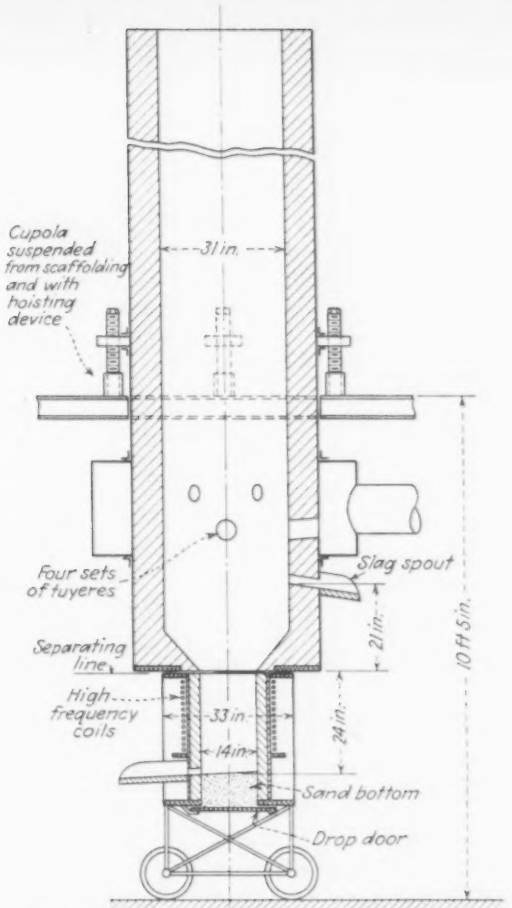

FIG. 2—Suggested design of a larger type of induction-heated cupola featuring a cone-shaped section below the slag spout. This unit is rated at 4 tons an hr.

From a metallurgical and operating point of view, the high-frequency furnace could be given preference. On the other hand, the construction of a furnace operating at lower freqencies would be cheaper and could be connected to existing power sources. However, when in operation, the melting gutters located in the lower portion of the furnace-stack would probably be somewhat in the way. There might also be the danger that the melting gutters might become clogged with pieces of coke. It is a fact that the frequency of the electric network produces greater fluxing and it is therefore possible that the lining of the furnace might burn out too quickly. This, however, could be checked, in accordance with a proposal of Brown, Boveri & Co., who suggest raising the crucible over the induction-coil, thus creating a portion of the melt which would not be affected by the inductive current, and which would, therefore, be at rest, and which through its weight would soften the fluxing of the affected portion.

Since the induction-heated underframe has to perform only the operation of the superheating, only about one-third or one-fourth of the electric energy is needed for the quantity of molten iron that would be necessary for the melting of a solid charge. For a smaller cupola

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with a diameter of from 27 to 31 in., and with a capacity of approximately 5 tons per hr, it would not be necessary to operate with from 1000 to 1200 kw, as would be required if the furnace were charged with solid material. It would need, actually, 350 to 450 kw in order to tap from the low-frequency furnace. From the high-frequency furnace, which has a capacity of around 2 tons, approximately 1.6 to 1.8 tons of metal could be tapped every 20 min.

If, besides the existing equipment of the high-frequency underframe, the furnace be provided with two crucibles, of which the one used with the induction-heated cupola would have to have approximately 60 pct more capacity (in accordance with the volume of the coke charge), it would be possible to produce in the furnace with the smaller heating coil, while the cupola is not operated, cast steel from a solid charge of approximately 1 ton.

Since in the low frequency furnaces the gutters cannot well be kept free when the temperature of the iron rises above approximately 2600° F, it would be necessary for this special purpose to make tests with an appropriate lining for these devices. Of course, the best course would be the development of a low frequency induction furnace without any gutters for the melting of heavy metals in the same manner as has been developed in the construction of the Brown, Boveri & Co. furnace for the melting of lightweight metals.

The advantages of such a furnace would be that besides eliminating the gutters and using simple types of crucibles, as they are used with the high frequency or middle frequency furnaces, the low frequency furnace could be connected to the existing power supply.

Fig. 1 shows the design of the first small induction-heated experimental cupola furnace which Dr. Piwowarsky submitted to a leading builder of furnaces in Germany, so that they might work out the construction plan of the project. A small experimental cupola, with a diameter of about 8 in., which, in addition to the larger hot-air cupola, is located in the Foundry Institute of Aix-la-Chapelle, will work with an induction-heated furnace-underframe, the capacity of which will be designed in such a way that every 15 min about 165 lb will be superheated at least 300° F, for instance from about 2450° to 2750° F, and then can be poured.

Since it might be useful to construct the induction heated underframe so that it could be easily disconnected from the melting space proper, it will be necessary to provide for the suspension of the cupola, or to support it on columns. For larger furnaces it will perhaps be necessary to construct the induction-heated underframe in the form of a forehearth, in which the continuously flowing molten iron must be run into a bed of coke or corundum, which is safeguarded against being driven upwards by weighting it down. Because of the difficulty of getting any supplies in Germany at the present time, it will be necessary, according to Dr. Piwowarsky, to construct the small experimental induction-cupola in the form of a low-frequency furnace. By placing the gutters horizontally instead of vertically, it is expected that it will be possible to achieve special advantages from a metallurgical and operative point of view.

For larger cupolas it might be further advantageous to construct the lower portion of the furnace in the form of a cone, as shown in fig. 2.

A combination of furnaces in the form proposed will, Dr. Piwowarsky said, probably comprise all the necessary advantages of a metallurgical character which must be present in order to be able to produce cast irons of any desired composition and of any desired quality. No doubt this combination would also help solve the coke problem and would be acceptable from the economical point of view, especially to the foundries which produce iron as well as steel castings.

Operation of Commercial Plating Job Shops

TECHNICAL and economic problems involved in the establishment and maintenance of commercial plating job shops have been investigated by a Dept. of Commerce inquiry section. The type and cost of equipment necessary and where to buy it, and the technical processes involved in electroplating, tinning and galvanizing, and the metallizing of baby shoes are discussed in this series of reports issued by Office of Technical Services, Dept. of Commerce, Washington.

Electroplating job shops to perform chrome, nickel, copper and cadmium plating are described and a schematic layout of a typical plant is shown. Details on plating procedures, proper linings for electroplating tanks and polishing operations are given.

Cleaning, pickling and fluxing operations and the standard method of dipping are described for hot dip tinning. Galvanizing by the hot zinc dipping process is discussed from the standpoints of preparation of the base metal, proper temperature of the molten zinc and the alloying action which influences the life of the dipping containers. Equipment required and a technical bibliography are included.

Silver plating processes, formulas and plating solutions, and sources of supplies and equipment are given in the silver plating report. Cost of equipping a small plant for normal operations is estimated to between $1500 and $2000. A layout and inventory of equipment for this size shop is discussed.

Information on five processes for metallizing baby shoes to preserve them as keepsakes is given and several firms from whom equipment for this work can be obtained are listed.

The Extrusion Molding Process

By H. B. COOK, from the research records of CHARLES C. MISFELDT

A description of the processing of various metals, including steel, by the extrusion molding process is continued in this, the concluding part of a two-part article. The author comments on the interesting possibilities of Be-Ni-Cu alloys, extrusion molded, for high temperature service, and also touches upon the desirability of more extensive use of proportional limit values for design purposes. The author indicates how the use of heat resistant materials establish limitations to operating temperatures on jet engines which restrict their power efficiency. By using high thermal transfer materials, which can be readily cooled with small amounts of coolant, higher temperatures such as those obtained in aircraft friction type engines can be taken advantage of. The article concludes with a detailed discussion of the construction and operation of the extrusion molding machine.

BERYLLIUM nickel copper alloys that have excellent properties at elevated temperatures, have also been extrusion molded into gas turbine blades with excellent results. Some combinations of beryllium nickel copper can be cast and not forged, while others can be forged if good castings could be produced from which to make the forging.

Alcoa 355 casting alloy with many excellent characteristics is normally not considered as a hot work alloy, but thousands of molded extrusions have been made from it and heat treated. The quantities cover a wide range of shapes and sizes. The properties taken from coupon specimens machined from the center of the parts show the following results in the heat treated (T6) condition, 48,000 to 65,000 psi ultimate strength, 30,000 to 36,000 psi yield strength at 2 pct offset, 7 to 14 pct elongation in 2 in. The modulus of elasticity is 11 million and in design it is safe to use 19,000 psi as the proportional limit.

In most all cases elongation, proportional limit and modulus of elasticity are higher when extrusion molded than the same alloys forged or otherwise hot worked, while other properties run about equal, or occasionally vary on the low side.

The first part of this two-part article, published in the January 29, 1948, issue, p. 62, described this new process, with particular emphasis on its potentialities as a means of processing gas turbine parts.—Ed.

The improvement in modulus and proportional limit is the result of the very uniform fine grain structure throughout the cross-section and from surface to surface in the molded extrusions. Fig. 11A shows grain size of commercial beryllium copper in the rolled plus heat-treated condition which can be compared with fig. 11B which shows the grain size of MM-32 beryllium copper extrusion molded and treated. Fig. 12 shows the microstructure both longitudinal and transverse, of the same extrusion as that shown in fig. 11B. Fig. 12B shows structure of same melt as permanent molded, and fig. 12C covers the same melt as sand cast.

A similar comparison of cast extrusion molded microstructures of an aluminum alloy is made in figs. 13A and 13 B. Fig. 13A shows the metal, aluminum alloy 355, as sand cast and then the same samples after given heat treatment T6. Fig. 13B illustrates the same alloy as an extrusion molding both in the treated and untreated conditions. In the extrusion molding of aluminum 355, speeds and temperatures can be varied to eliminate all indications of primary lakes or liquid phases appearing in the final product. In fig. 13B the micros at high magnification show slight indications of primary lakes but this phase is not detrimental to the properties of the alloy when limited to such small amounts.

The MM-32 beryllium copper alloy is castable but not forgeable. Alloys higher in beryllium plus nickel and with less copper are neither castable nor forgeable, hence would be useless in industry without the extrusion molding method or at least an equivalent process.

This article copyrighted by Charles C. Misfeldt, Feb. 5, 1948.

Alcoa 75ST, which is one of the newest and strongest of aluminum alloys, is normally supplied in rolled sheet and some extruded and forged shapes, but is not considered a casting alloy possibly because of its tendency for internal shrinkage in thick sections. Aluminum alloy 75ST has been extrusion molded into various parts very successfully; for example, some of the turbine rotors in fig. 14 are 75ST. Standard heat treatment increased the hardness to 178 Brinell. By comparison, the same alloy when forged into propeller blades and given the iden-

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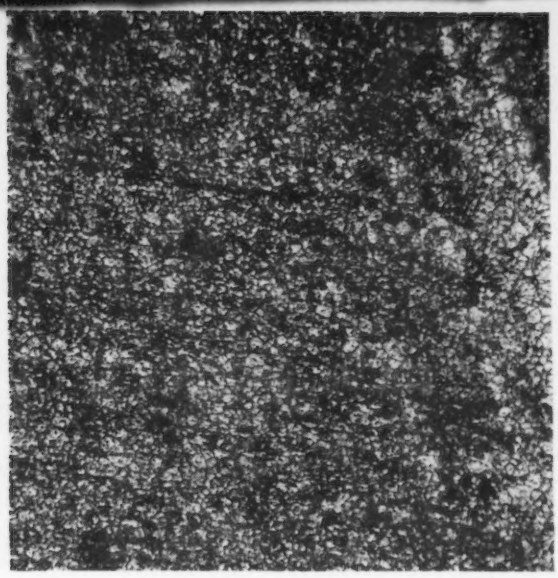

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Fig. 11a—Rolled

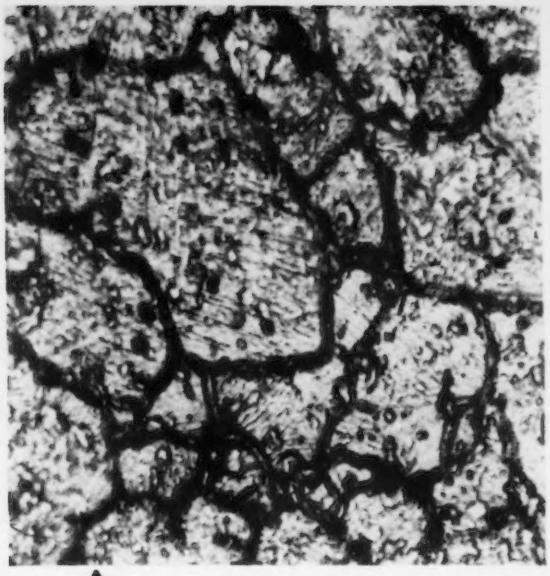

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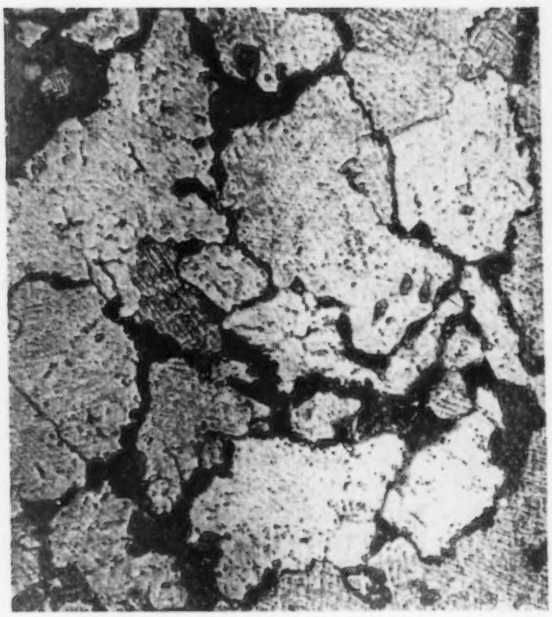
Fig. 11b—Extrusion Molded



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FIGS. 11a and 11b—Be-Cu alloy MM32 in the rolled and extruded form. Both types were solution treated. Etch: NH_4OH and H_2O_2.

tical heat treatment gives a reading in the range of 140 to 142 Brinell.

Howard Foundry's magnesium alloy Flylite 5, the same as used in the B29 nose and tail castings, has been extruded and molded. Test bars cut from parts had an ultimate tensile strength of 56,000 psi with normalizing treatment only, while the same alloy in the sand cast and normalized state has a tensile of 24,000 to 26,000 psi. Alcoa 13, a high silicon diecasting alloy with ultimate strength of 34,000 psi, elongation 3 pct, and occasionally going, in special diecast test bars, to 40,000 psi, has shown in coupons cut from molded extrusions made in production tensile values up to 55,000 psi and 12 pct elongation. Alloy 13 is not a heat treatable alloy.

One particular advantage to the extrusion molding process is that a certain portion of the solution treatment is imparted to the metal in the as-extruded state. In many production parts only an aging or precipitation treatment is required to obtain the necessary tensile values, whereas when the alloy is cast or forged, another heat treatment for meeting specification proper-

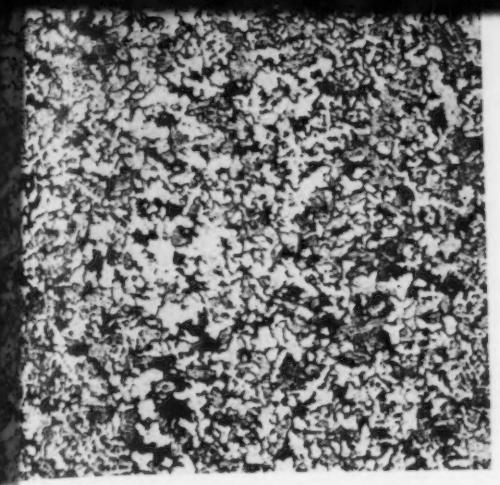
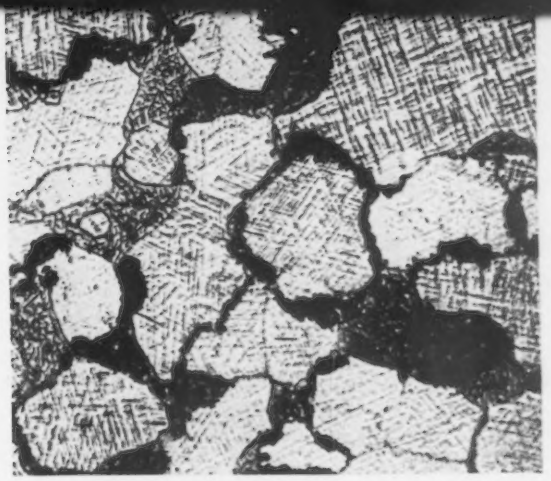


Fig. 12a—Extrusion Molded (longitudinal)



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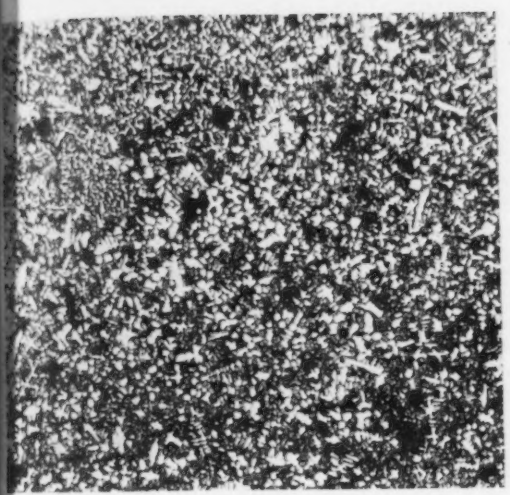

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Fig. 12a—Extrusion Molded (transverse)

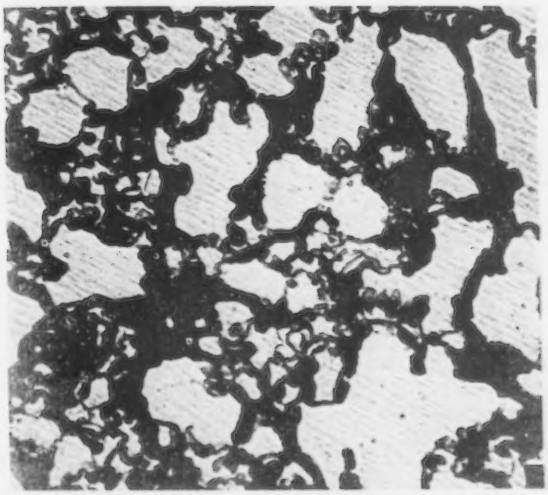

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Fig. 12b—Permanent Mold Casting 500X

FIGS. 12a, 12b and 12c—Micrographs of the Be-Cu alloy in various cast forms. Etch: 10 pct ammonium persulfate.

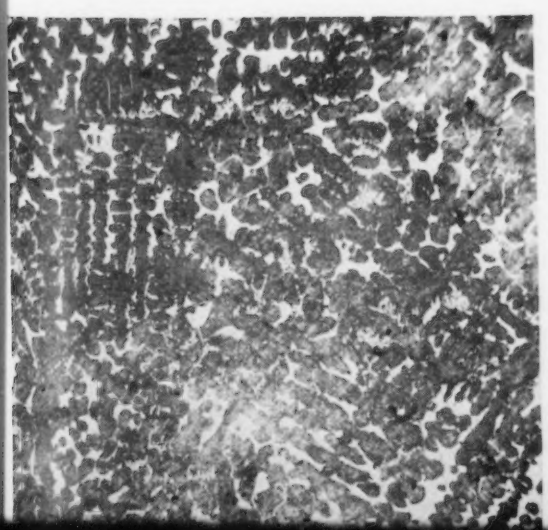

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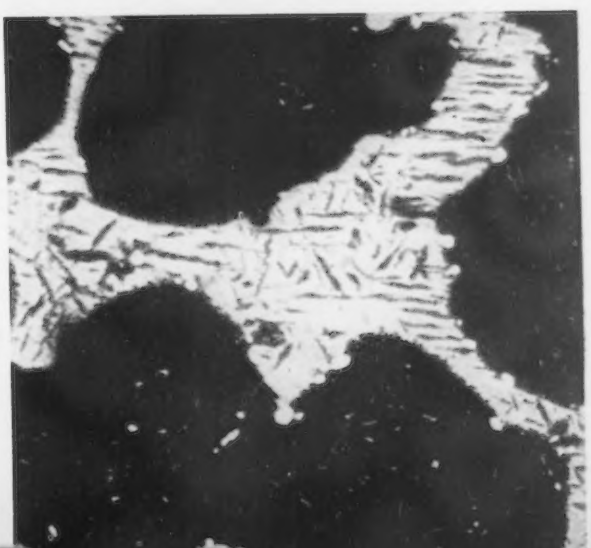
Fig. 12c—Sand Casting



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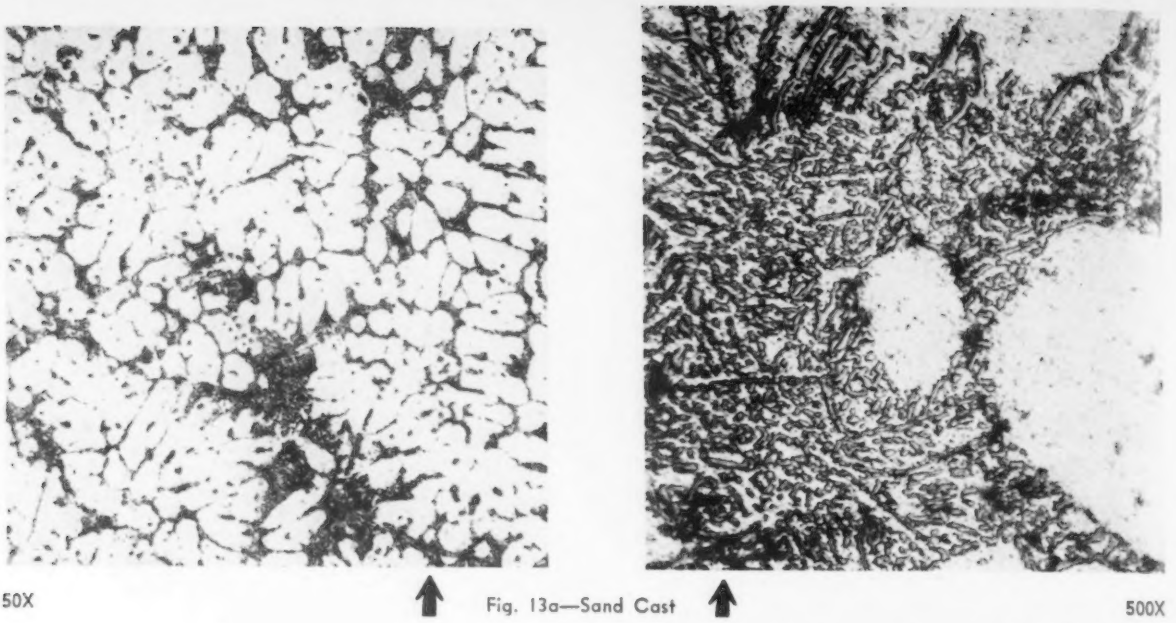
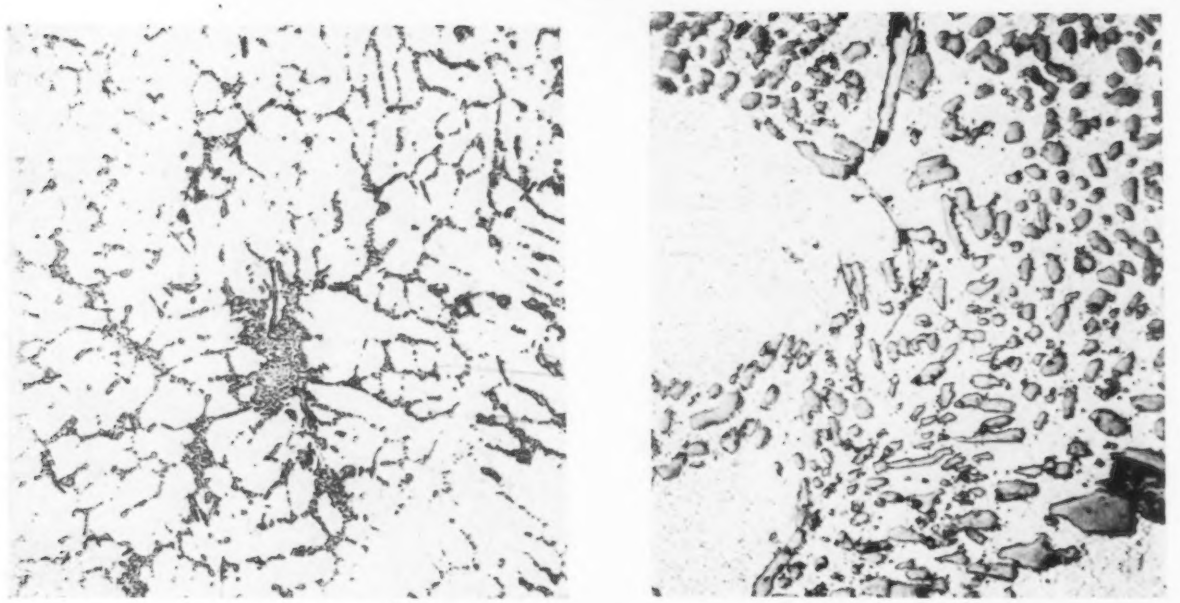


50X Fig. 13a—Sand Cast 500X



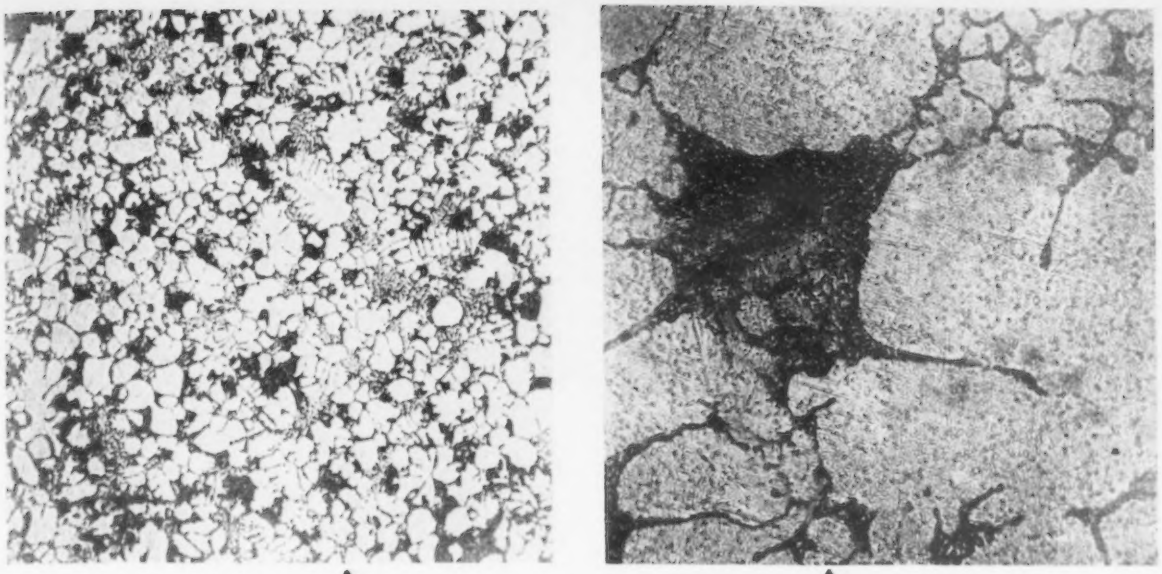
50X Fig. 13a—Sand Cast—Heat Treated 500X

FIGS 13a and 13b—A comparison of aluminum alloy 355 as a molded

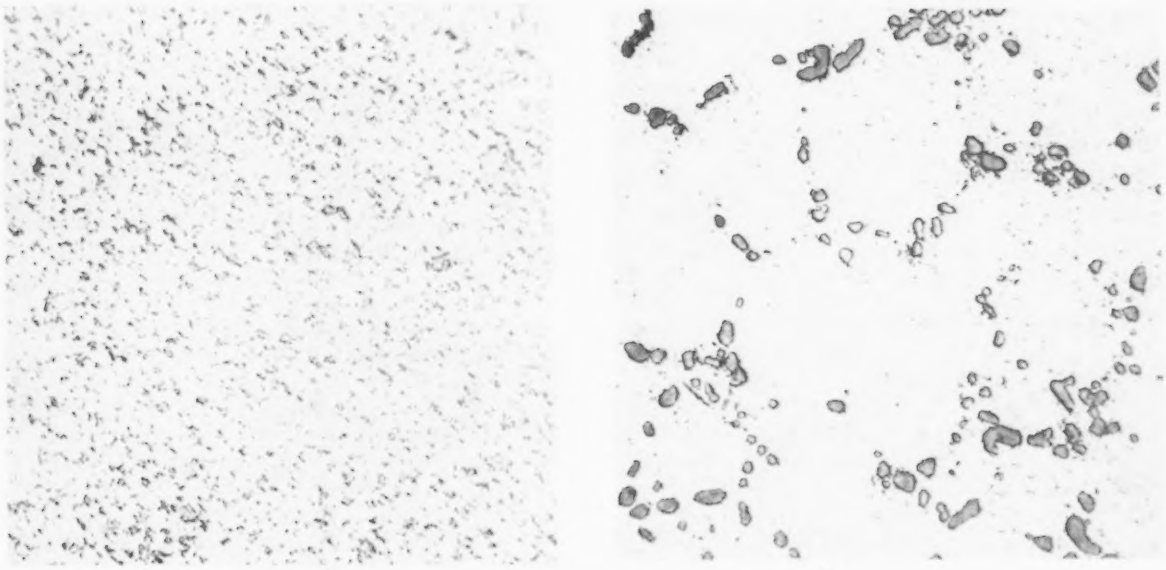
ties is usually required. This feature is of importance to parts that must hold their shape very accurately and which, even as molded extrusions, change very slightly if subjected to solution treatment temperature.

While all types of standard nonferrous alloys have been extrusion molded with comparative success, many have actually been run in production with success. To be certain that the research had developed a method which could process all alloys, many combinations of elements have been alloyed and fabricated into parts and at the same time the same material has been cast, and in some cases forging has been attempted with very unsatisfactory results. The conclusion reached was that alloy fields for forgeable and castable alloys are rather well covered by available combinations and also that any further radical development in alloys with more useful properties for the engineers would require a process such as used for molded extrusions.

Steel alloys have been processed by the extrusion molding technique which, insofar as properties and flexibility of the method are concerned, was satisfactory. There are certain problems that make the use of steel or other very high melting temperature alloys a matter of further research which is being continued at present. The need of materials and a casting method for making dies, cylinders and extrusion pistons are the problems that make the processing of very high melting temperature materials, for the present at least, very costly and impractical. Much thought and work has been directed to the use of sintered materials and to ceramics for high temperature molds. However, it was found to



50X Fif. 13b—Extrusion Molded—As Molded 500X



50X Fig. 13b—Extrusion Molded—Heat Treated 500X

extrusion and as sand casting. Etch: 0.5 pct HF for 15 sec.

be quite a waste of time and money, much the same as sometime soon will be evidenced by those who are attempting to use ceramics for turbine blades, as well as ceramels.

As an approach to the solving of the problem of fabricating parts for high temperature operation, we have followed the theory and have had excellent results by avoiding the use of present known alloys. The research has been confined to the development of beryllium-nickel-copper combinations, by additions of such elements as tungsten, chromium, silver and several others that give a low extrusion molding temperature and high properties at elevated temperatures when fabricated. The importance in these types of alloys seems to be in the fact that they have a much higher proportional limit at elevated temperatures than any of the present known high temperature materials. This property, along with excellent retention of hardness, yield, tensile and modulus of elasticity, obviously makes them extremely interesting.

Beryllium is known to improve the fatigue and high temperature properties of alloys, probably because of the increase in proportional limit which, when used in the design calculations for high temperature parts, gives every indication that the possibilities of fatigue failure at elevated temperatures are practically eliminated. With present day recording extensometers, proportional limit values can be checked very accurately and are safe to use for design purposes when fatigue is the problem. No doubt in years past the proportional limit value could not be

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accurately checked causing its importance to be overlooked by metallurgists and engineers.

These points, coupled with the improvement in proportional limit properties by processing with the extrusion molding method, indicate there is a near at hand solution to many high temperature design problems. For example, the same section in a turbine blade made in steel, as one made of the new alloys described, will have a lower proportional limit strength than the beryllium-nickel-copper alloys, either at room or at an elevated temperature. Thus, when the reversals take place during the rotation of the turbine wheel, there is less, if any, working of the metal caused by the reversals and less fatigue of the metal due to the high proportional limit.

When considering metals with high thermal transfer, it is quite doubtful if creep strength is actually an important design factor in turbine wheels as made by the extrusion molding process design because there are no mechanical joints. The molded extrusion design of a turbine wheel has much better thermal transfer and consequently does not heat up because the blades are integral with the shroud, as well as continuous around the diameter of the wheel. With the shroud, blades and hub one piece of metal, heat cannot concentrate on the thin blade sections. Therefore most of the present problems of the turbine wheel assembly are eliminated, and with the reduction in weight and cost. Fig. 15 illustrates the extrusion molded design for a turbine wheel for a gas turbine engine.

Not enough attention has been given to the value of using proportional limit of materials for design purposes. For example, the Wright Field specifications covering the use of castings in design require that a casting alloy with a test bar value of 30,000 psi be used as an actual stress value of 15,000 psi for design purposes. They then allow a safety factor of at least 1 and usually 1½ or 2. This means if the 1 factor is used for design that 7500 psi is the actual value used for determining the sectional areas of the casting, and if the 2 factor is employed that 3750 psi is used. Along with this value there is the worry to the engineer as to the "ductility" of the material. No one has yet given a satisfactory reason for or definition for the use of ductility in design of a part. Normally the intention of an engineer is to provide a part that will carry the load without changing or becoming what might be considered as ductile because he knows as soon as a part becomes ductile it will at some later time fail from fatigue, unless it is a rubber part. Whereas if proportional limit values had been established and used for design, fatigue failures can be avoided.

Perhaps this situation is the fault of following established practices and the security that is afforded to civil service and technical instructors to continue down a beaten path regardless of the existence of a new highway that may be even shorter and safer.

It has been observed that many inspection and metallurgical laboratories in industrial and government operated plants are prone to evaluate their testing of parts or materials on the basis that they must find a flaw somewhere either by a slight variation in a chemical analysis or a defect by Xray or Zyglo. Oftentimes they cut up the part and make the flaw look like a crater on the moon by preparing a microphotograph at 500X which is combined in a report covering pages describing the defect as gas porosity, shrinkage, enlarged grain size, segregation, microshrinkage, slip planes, oxides, etc. Such a report perhaps justifies in their minds the investment the management has made in their salaries, but do these reports prove anything of value? Many such defective parts when load tested, either statically or dynamically, have the strength that is required. The best answer for a production manager to such an inspection report showing metallurgical defects, is "so what," and then have the part tested properly to establish a basis by which the defects can be evaluated when found by the many good inspection mediums available.

Many efficient laboratory and engineering departments have established and are using inspection procedures to evaluate production parts resulting from new processes as well as old. There is little doubt if ever a perfect part has been produced—they all contain some defect that when enlarged 50 or 500 times may look very bad. Our present production standards may be very safe—but not economically sane and safe.

Previously, it has been mentioned that parts were easily reproduced by extrusion molding when once production techniques are established. While there are a multitude of problems involved in establishing the production routine, the real factor which limits production is the necessarily slowed-up method as compared to a process such as diecasting. In extrusion molding care and maintenance of the mold, which in many cases such as the turbine wheel requires a thorough cleaning and the application of four different types of mold coatings, are necessary to aid in filling the mold properly. The turbine wheel mold has 22 cores in each half which must be held at a maximum clearance of 0.0015 in. and a minimum of 0.001 in. The molds are held automatically at 650°F. Each of the cores must be checked with a feeler gage in two places before closing to insure the proper clearance.

Physical properties are always better if not more than 25 parts are made per hour. On such parts as illustrated in fig. 14, not more than one part per hour would be anticipated. However, the one part would be 90 pct complete and would replace an assembled part costing perhaps $12,000 as made by present methods. Similar turbine rotors made by extrusion molding have cost approximately $500. Such a saving may seem fantastic. However, it is not out of range when it is considered that a somewhat similar part has been produced by extrusion molding with a comparable saving in proportion to the cost of those parts which had to be machined from a forging.

The parts in all cases are made from metal in crude form, either ingot melted and held in a pot for transfer to the machine where it is allowed to freeze slightly before extrusion, or a special cast ingot, induction heated to the proper temperature for extrusion.

Forged bar stock cut to length has been processed but the slight increase in physical properties over the special cast ingot does not warrant

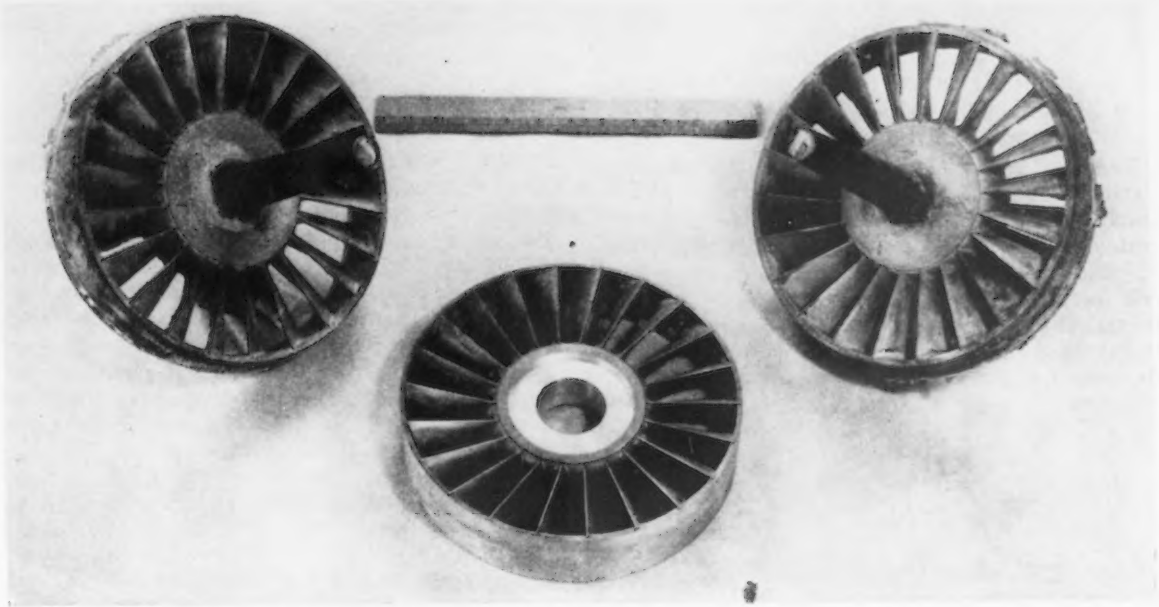

FIG. 14—Shrouded gas turbine wheels of 75ST aluminum alloy produced in one piece by extrusion molding. The die for this piece has 22 cores in each half of the die which must be held to a clearance of 0.0015 in. max and 0.001 in. min.

the added cost. Centrifugally cast ingot gives the finest type of results when it is processed into molded extrusions although it is rarely necessary to resort to this method.

All salvage material, sprues, butts, etc., are remelted and utilized, the scrap from equipment using induction heating is superior to any other type. Parts are always approximately 90 pct finished, perhaps on such parts as the turbine wheel the percentage of completion would be 98 pct as compared to one machined from a forging.

The extrusion molding machine (fig. 1) was designed as a cantilever unit combining the two opposed cylinders, the stationary platen and the base which contains an oil cooler and sump, in a one piece mild steel casting. The tie bar on the machine was added because large parts in progress required more load than the cantilever design would safely permit.

The stationary platen mounts a cylinder used for cutting off the butt. The butt is pulled out of the extrusion sleeve with the piston. The sprue remains with the part as the mold is opened. The cut off blade is operated either by hydraulic sequence or by electric control. Electrically, the press is manual or automatic, and includes timers to give absolute uniformity in operation cycles. The electrical control panel (fig. 5) mounts all relays for functional control. Each control button has a corresponding light which, when on either automatic or manual, lights up after the solenoid has been energized and goes dark when the operation is complete. Thus the operator can observe all operations of the complete cycle at all times.

The automatic heating control is on top of the electrical control panel. The machine is awaiting the induction equipment although the induction operation has been previously tried and set up for production on the small experimental equipment. Until the installation of the induction equipment, a special constructed gas furnace is in use, which holds the metal within a temperature range of 5°F.

All hydraulic valves and piping are concealed in covered pits beneath the floor, due to the high pressures used, to avoid the possibility of a fire hazard should a hydraulic line break.

The accumulator, in order to have ceiling height when in the raised position, is installed in a pit 9 ft deep which is covered except for the projection of the ballast tank through the cover. The cover is at floor level.

Probably the most perplexing problems encountered in the development of the extrusion molding equipment were entirely metallurgical and required rather extensive and expensive research. The orifice parts, as made from forged billets, were the most serious problem. Quite often, after a few production pieces were made, a crack would develop caused by the flow of the metal in the billet when forged. This problem was solved by the development of a steel alloy from which the orifice part could be cast. It is desirable to cast the extrusion cylinders from the same alloy. Because the special steel castings are not always available, steel tubing sleeves can be used except when running beryllium-copper-nickel alloys.

The extrusion piston was equally troublesome due to the tendency of steel pistons to gall the steel cylinder because of the highly concentrated temperatures resulting from the poor thermal conductivity of the steel and from the pressures which caused fatigue. By making a casting from a special alloy of beryllium-nickel-copper the piston problem was solved. This was the first application for which the high temperature materials were put to practical use. For example, beryllium-nickel-copper can be processed in the machine using a beryllium-nickel-copper piston to push the metal through the extrusion orifice. Due to the high thermal transfer of the metal piston the tip does not overheat.

The molds (see fig. 4) for the extrusion mold-

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ing machine are somewhat similar to a die-casting die, although much heavier and made from the finest hot work steels available. They are equipped with heating devices and connected with thermocouples so that temperatures can be maintained accurately.

The mold must have more precision than die-casting molds and the parting faces must fit as nearly perfect as possible. The cavities are not vented. The molds contain primary cavities which are the shape of the part and secondary cavities which are an auxiliary overflow located around the perimeter of the part. As the slug of extruded mushy plastic metal enters the primary cavity, the air is compressed and is thus

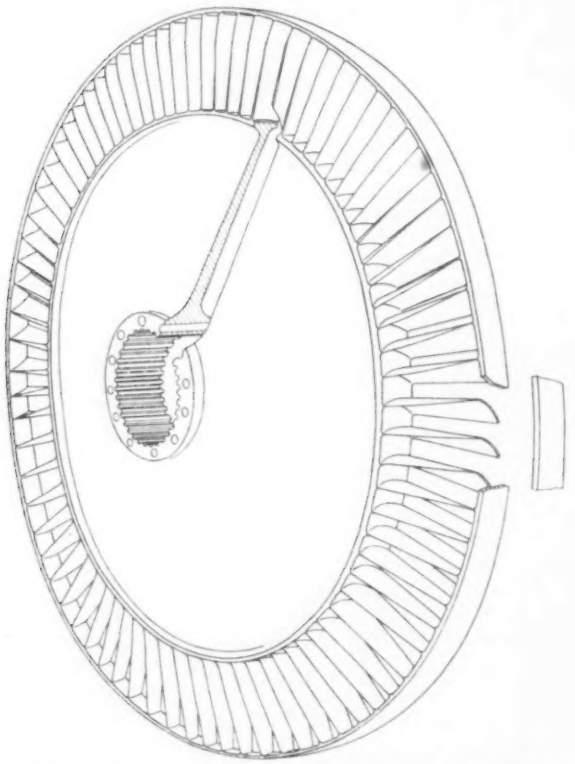


FIG. 15—Sketch of a rotor for a gas turbine designed for extrusion molding.

displaced and fills the secondary cavity. From there the air is further compressed into unvented overflows during the molding cycle. The unvented overflow cavities are connected to the secondary cavity or to the primary cavity (see fig. 7) according to the way the mold is constructed. Molded extrusions require an internal pressure in the mold. With some alloys the mold is filled with a special gas or atmosphere which, after a desired pressure is built up within the cavity, is forced into a chamber through relief valves so that it can be reused.

The equipment is not particularly complicated and the principle of the extrusion molding method is relatively simple but there are a great many controls required for the necessary functions of each cycle and to efficiently control conditions for an accurate duplication of the cycle.

The cost of an 18,000-ton hydraulic press for rough pressing or forging a magnesium engine crank case, would build, perhaps, six extrusion molding machines. The molding machines would turn out the same magnesium case many times faster, requiring very little machining as compared to the rough forging or pressing.

Design stress allowables for molded extrusions have not been set up at Wright Field. Those parts supplied to the aircraft industry have been accepted on the basis of establishing the design by proof-test to determine their acceptable strength. This has become a general practice and quite widely adopted where airplanes are being designed for weight reduction. This is by far the best way to use the parts in design inasmuch as many of the alloys we can highly recommend are not incorporated in the specification handbook. It is obviously more practical to fabricate a part from a material that is most suited to the requirements of the engineer than to hold the process down to those that have established specifications for the simple reason they were forgeable or castable. However, all of the nonferrous alloys with established specifications can readily be processed.

During 1941 when the experimental work was complete it seemed desirable to establish an aircraft specification. As a result of a request of one of the aircraft customers, several hundred samples were taken to Wright Field for testing. The customer was interested in using higher stress allowables than was permitted for castings and there was nothing in the design manual to indicate what allowables could be used for molded extrusions.

Along with the parts taken for test were pressure mold castings and samples of the molded extrusions, some of which were parts made previous to the actual refinement of the method and were not by any means perfect. The Wright Field report resulting from this exhaustive test was rather interesting. The molded extrusions were sometimes called pressure mold castings and vice versa. The imperfect experimental molded extrusions were subjected to all of the X-ray and analysis checks, as were the actual specimen parts made by the perfected method. The result was most confusing and it was decided that obtaining a specification might last throughout the war and into some other war so the matter was dropped and industry has been elected to be the judge of the product.

Some good did come from the experience at Wright Field, however. A specification was finally written covering pressure mold casting, but it was not tied down to a standard, covering the type of equipment, methods of pressures to be used, and resulted in getting many diecasters into trouble trying to make pressure mold castings on equipment that was not suitable. Had a standard been set up or had they known what was required they would not have become involved with the job or would have made proper arrangements to do the job. It was a specification somewhat like the present X-ray specification; there is a requirement, but no standard to serve as a yardstick has been set up by which X-ray rejections could be judged and it remains a matter of varied opinions, without test data standards, to support acceptance or rejection.

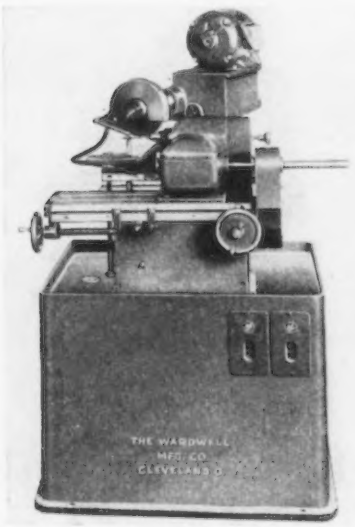
(CONTINUED ON PAGE 134)

New Equipment . . .

A universal flute grinder, a high-speed precision lathe, a press type spot and projection welder, a machine for intricate filing of dies, gages and cams, magnetic separators, a gaging machine which segregates lapped parts, a comparator for checking gage blocks by air, and vertical gearmotors are reviewed herein. Also described are a metallizing wire that bonds, and stainless steel paint.

Universal Flute Grinder

IDENTIFIED as No. 90FS, an automatic universal flute grinder has been announced by *Wardwell Mfg. Co.*, 3167 Fulton Rd., Cleveland 9. This machine was designed to do straight or spiral grinding from solid, in tools such as small carbide drills, taper pin reamers and other work as small as 1/16 in. in diam and has a capacity up to 10 in. diam and 9 in. table travel. It is equipped with an automatic indexing head, which is provided with an automatic locking device of index plate. The spiral fluting is accomplished



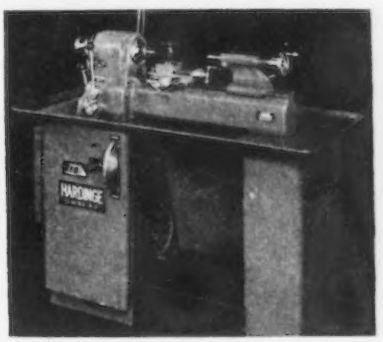
through a chain of gears at the end of the work spindle and connected to the lead screw in the table slide. Spiral lead as short as 5/16 to 1 turn can be obtained. The machine can also be arranged for automatic milling.

Welding Shutoff Valve

DESIGNED to prevent oxygen and acetylene waste in shops doing production welding, a quick shutoff valve has been developed by *Linde Air Products Co.*, 30 E. 42nd St., New York 17. Called the Oxweld V-31, when used with the oxyacetylene blowpipe, it controls the supply of both oxygen and acetylene or other fuel gas. Gas consumption stops when the blowpipe is hung on the hook of the valve. The valve is equipped with a pilot light, over which the blowpipe is passed to be relighted when welding is resumed. It is designed for operating pressures up to 100 psi.

Precision Lathe

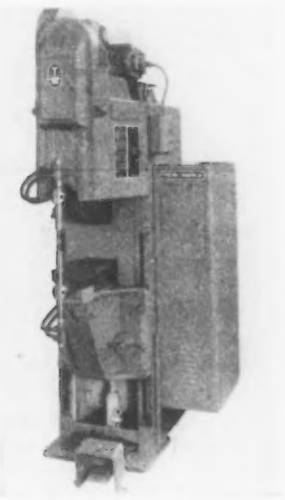
PRODUCTION of a new model high-speed precision lathe with variable speed drive and free-spindle clutch has been announced



by *Hardinge Bros., Inc.*, Elmira, N. Y. New features of this model include hardened and precision ground steel bed ways of dovetail design. The lathe bed has a 3-point mounting on the welded steel pedestal base. The fully enclosed headstock has a preloaded ball bearing spindle, which is ground to take 1-in. capacity 5C Hardinge collets, and 6-in. capacity step chucks. The headstock spindle is driven by center-drive belts. Two-inch diam feed screw dials are graduated for direct reading in thousandths of an inch. The variable speed drive provides infinitely variable spindle speeds from 90 to 3500 rpm. For fine precision internal and external grinding on very small diameters a grinder switch has been provided for controlling the motor of the high speed grinder attachment.

Spot and Projection Welder

ANNOUNCEMENT of an improved type ENB motor driven press type spot and projection welder has been made by *Taylor-Winfield Corp.* Warren, Ohio. One of the improvements is the adaption of the roller anti-friction head to this welder and the extension of the anti-friction features to include the bellows air lock, and bearings for cam follow-up and drive box. The new cam has been de-



signed to provide maximum welding force at maximum spots per minute with minimum loading of drive unit. Up to 200 strokes per min may be had it is reported with no alteration to the welder other than changing cams. Maximum rigidity for projection welding is assured by the use of composite copper-steel knee construction plus a rugged frame and head support.

Tool Steel

TOOL room specialty steel has been announced by *Amalgamated Steel Corp.*, Newburgh Mill

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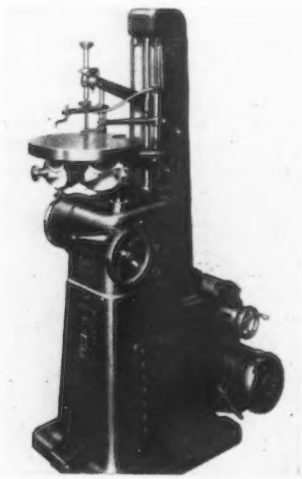
District, Cleveland 5, which is claimed to be a balanced alloy tool steel embodying the best features of oil, air, and water hardening steels which can be used for general purposes throughout tool and maintenance departments. Inasmuch as T.R.S. steel may be quenched in oil, water, or salt bath, almost any degree of hardness may be had. It is also claimed the new product will not crack in heat treatment, welds readily, forges, and machines with an excellent finish. The steel is available in flats, rounds, squares, hexagons, octagons, and billets in various sizes.

Die Making Machine

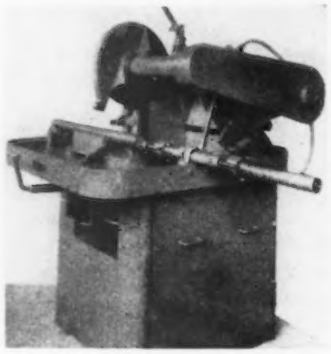
FOR machine filing of dies, gages, cams, templates, machine parts and other types of work, *Connecticut Tool & Engineering Co.*, 544 Iranistan Ave.,



Bridgeport 4, Conn., has introduced the model F-1 die making machine which has been designed to permit the handling of any type of intricate filing. The lower stationary arm and upper movable arm which support the files and saws are mounted on a shaft held by bushings above and below the work table, an arrangement said to provide greater accuracy in sawing and also to prevent bell-mouthing in filing. The machine can use saws from jewelers size up to ⅜ in. in width and files in thickness from 1/64 to ½ in. Two hand wheels and a knob mounted on the spindle are for setting and locking the file stroke to any required length from 0 to 5 in. A foot switch starts and stops reciprocation of file. Power is furnished through a ½-hp, 1800 rpm, 220-440 v motor located on the rear of the machine.

Cut-off Machine

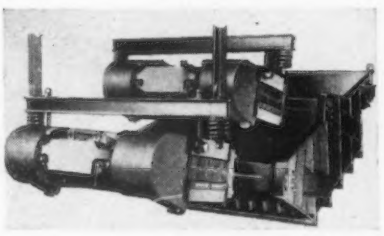
DESIGNED for the metalworking industry and particularly applicable to machine shops where brass, bronze and steel in bar stock, tubing, angles and flats require cutting, a cut-off machine has been marketed by *Tabor Mfg. Co.*, 6225



Tacony St., Philadelphia 35. Adequate power to maintain the proper wheel speed in cutting any quantity of metal or plastic is supplied by a fully enclosed, fan-cooled 10-hp motor. Electric controls for both the cutting wheel and coolant pump are at operator's finger tips. Cutting wheel is guarded for safety, but cutting operation is fully visible. Coolant is fed to both sides of cutting wheel at the hub, then thrown centrifugally at the cut, causing overall cooling action. Coolant reconditioning is done in primary and secondary settling tanks. The machine accommodates wheels up to 16 in. diam and up to 3/16 in. thick, with wheel speed of 10,000 fpm. Capacity of the machine is 2½-in. rounds, squares or hexagonals; 3x⅜ in. angles; 4½ in. OD tubing; ¾x3 in. flats.

Vibratory Feeders

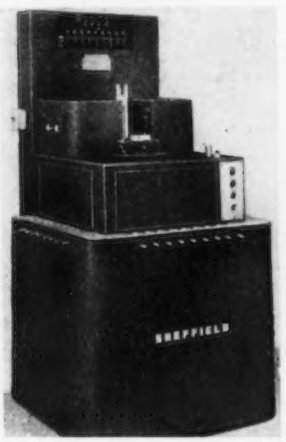
DESIGNED for the large capacity separation of crusher feeds, the F-55 double magnet, heavy duty electric vibratory



grizzly feeder has been added to the line of feeders produced by *Syntron Co.*, 694 Lexington, Homer City, Pa. Grizzlies are available in different sizes and styles, either single or double magnet, with the magnets mounted above the deck or below. All feature variable control of the rate of feed and with either full or partial grizzly decks. Operation is from 220 or 440 v ac.

Gaging Machine

A GAGING machine said to automatically segregate lapped finish parts into 27 classifications without marring has been designed by *Sheffield Corp.*, Dayton 1. The machine was designed to handle hermetically sealed valve plates which could not be hopper fed or ejected without damaging the surface finish. In operation, a motor driven slide pushes the bottom plate from a hand fed vertical loading stack into gaging position. By means of airflow jets and gaging heads, the plates are checked and segregated into three 0.0004-in.



major classifications of diameter. Each of these major classifications is further checked and segregated into eight 0.0003-in. classifications of thickness. Rejected parts are segregated as follows: Undersize on diameter or thickness; salvage oversize on diameter; and salvage oversize on thickness. Rate of inspection is said to be 3000 plates per hr.

Air Circuit Breaker

FOR use on low voltage circuits, an air circuit breaker has been designed by *General Electric Co.*, Schenectady 5. Designated type AK-1, the breaker is available in two ratings, 15 to 225 amp with a 15,000-amp interrupting rating, and 35 to 600 amp with a 25,000-amp interrupting rating. Features of the breaker include improved arc interruption, accessories readily at-

tached in the field, compact, sealed-in overload trips, short-time rating equal to the interrupting rating, shielding of live parts and an all-metal mounting base. It is available for electrical or manual operation.

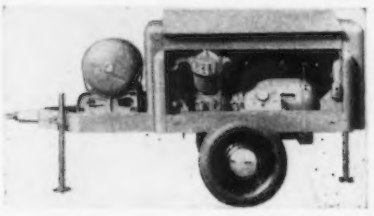
Magnetic Separators

A COMPLETE line of selfcontained horizontal and inclined magnetic pulley type separators

each incorporating an Alnico magnetic Perma-Pulley, idler pulley, endless belt and drive has been announced by *Dings Magnetic Separator Co.*, 4740 W. McGeogh Ave., Milwaukee 14. These units are designed to provide automatic removal of tramp iron from such materials as coal, ore, rock, slag, plastics, etc., where either protection of machinery or purification of product is desired. They are intended for installation at the discharge of chutes, hoppers and conveyor belts or they can be fed by hand or by various material handling devices. Standard models are available with belts of any desired length in widths ranging from 12 to 60 in. Perma-Pulley diameters range from 12 to 30 in.

Electric Compressor

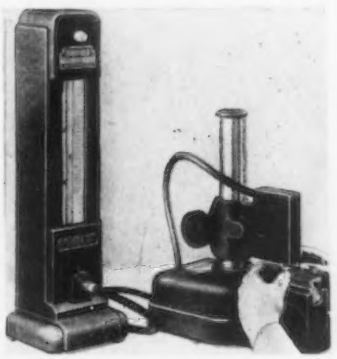
ELECTRIC portable compressors in 60-105-160-210-315 cfm capacities have been announced by *Davey Compressor Co.*, Kent, Ohio.



Available in skid, 2-wheel trailer and 4-wheel trailer mountings, the units will be known as Air Chief Electrics. Compressors are of two stage construction with inter-cooler and safety valve. They are direct driven from 1200 rpm, 220/440 v.ac motors of squirrel cage, horizontal type. Motor starters are full voltage, ac magnetic non-reversing, standard sheet steel NEMA type 1, 3 phase, 60 cycle with heaters for motor protection.

Gage Block Comparator

A METHOD of checking the length of precision gage blocks by air has been developed by *Sheffield Corp.*, Dayton 1. There is no gage point contact—the only pressure exerted on the work is that of a stream of air flowing against the upper and lower surfaces. The comparator consists of a gaging unit and a Precisionaire base instrument with an amplification up to 40,000 to 1. The gaging unit has one jet in the diagonally serrated anvil and another in the gaging head which is mounted on the bracket, adjustable vertically on the column. The air supply to both jets comes from one hose connected to the base of the instrument. Gage



blocks are checked against a master calibrated set of blocks which are used in setting up the comparator and obtaining a zero reading. The gage block to be checked is placed on the anvil between the two air gaging jets. Any change of the float from zero indicates the deviation from the master.

Nitrogen Generator

DEVELOPMENT of a nitrogen generating unit known as the Hi-Nitrogen generator has been announced by *Gas Atmospheres, Inc.*, 20011 W. Lake Rd., Cleveland 16. This unit is recommended for use in the metallurgical, chemical, refining and processing industries and is described as a combustion method unit for producing nitrogen at a cost of a few cents per 1000 cu ft of dry gas. The equipment is designed to operate on a mixture of air and natural gas or any manufactured gas.

Fork Truck

ENGINEERED for crowded operating conditions, both vertical and horizontal, and enabling palletized handling, a fork truck has been produced by *Automatic Transportation Co.*, 149 W. 87th St., Chicago 20, to be known as

the Skylift Shipper. The Shipper is capable of handling 2000-lb up-to-48-in. loads. Its collapsed height is 68 in; maximum lift 108 in. Tiering is also possible with the Shipper, because its telescopic lift is designed so that the forks and uprights are raised independently by separate rams.

Power Lift Truck

CALLED the Go-Getter, a walkalong power lift truck has been produced by *Revolvator Co.*, North Bergen, N. J. The Go-Getter is streamlined, selfcontained with adjustments within easy access. Its size between control handle and back of battery box measures 27½ in. It has a single package hydraulic lift unit. The platform

truck comes in 4000 and 6000-lb capacities; heights, 7, 9, or 11 in.; lengths 36, 48, 54, 60, 72 in. and over with 26½-in. width. The platform can be raised 4 in.

Soldering Flux

FAST, complete fluxing of oily and uneven surfaces is claimed for a non-acid soldering flux an-

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nounced by *Division Lead Co.*, 836 W. Kinzie St., Chicago 22. The penetration and spreading qualities of No. 229 soldering flux are said to permit perfect sweating of long, deep and irregular seams as well as diaphragms and other critical soldering work. It is claimed the flux does not pit, corrode or discolor. It can be used for soldering assemblies that are to be electroplated or finished.

Metallizing Wire

SPRABOND, a metallizing wire that bonds itself, has been announced by *Metallizing Engineering Co., Inc.*, 38-14 30th St., Long Island City 1, N. Y. Sprabond may be sprayed directly on to smooth, even highly polished steel, and many other materials without any surface preparation. The only requirement on many jobs is absolute cleanliness. Three steps are necessary in building up a worn shaft with metallizing: rough turn shaft, apply Sprabond and proceed with build-up. Sprabond can be sprayed by any metallizing gun.

Stainless Steel Paint

PROTECTION of plant equipment against corrosive fumes, acids or salt solutions is said to be simplified by the development of stainless steel flake which may be applied in paint form, *Charles Hardy, Inc.*, 420 Lexington Ave., New York, has announced. The flake can be mixed into a vehicle such as clear lacquer, varnish or bronzing fluid. The flake is also available in paste form containing 15 to 20 pct Varsol as a solvent and 1 pct stearic acid. For normal requirements 2 lb of flake or paste are used per gallon of vehicle. Stainless steel paint can be applied by brush or spray and is reported to stay bright in suspension. Its color is dependent on the vehicle used; the thinner and more transparent the vehicle, the brighter the silvery finish. The surface finish is hard and durable.

Portable Cleaner Stand

THE Tivit portable parts cleaner stand, announced by *Kelite Products, Inc.*, Box 2917, Los Angeles 54, is a sturdy, welded steel unit, which can be wheeled right up to the job. It holds a standard 5-gal can of Kelite cleaner and a 5-gal rinse can. Grimy parts are dropped into the basket as they are removed from the job and after a short soak the basket is lifted out and dunked in the rinse can. Parts are said to come out clean and bright, easy to repair and reassemble. Hinged drop-leaves at each side provide extra table space. Tool tray at bottom holds essential tools.

Vertical Gearmotor

ADDED to the gear drive line manufactured by *Westinghouse Electric Corp.*, 306 Fourth Ave., Pittsburgh 30, is a vertical gearmotor. Each unit is a self-contained drive, consisting of a high-speed motor and speed reducing unit. Nine different gear ratio combinations are available, ranging from 7.61:1 to 38.9:1. These

gearmotors are available in 3 to 50 hp, 220, 440, 550 v, 3 phase, ac and 3 to 7½ hp, 115 or 230 v dc. They may be equipped with practically any standard motor in a variety of enclosure types including open protected, semi or totally enclosed and explosion proof. Gear case is such that all gears and bearings receive positive lubrication at all operating speeds. Other features include maximum strength and tooth overlap; uniform loading —slow uniform wear; and lower impact stresses from sudden shocks or reversals.

Pickling Bath Inhibitors

SURBRITE S and H are developments of the *Hanson-Van Winkle-Munning Co.*, Matawan, N. J., classified as acid inhibitors, that is, compounds to be added to sulfuric acid and hydrochloric acid pickling solutions. However, they have the additional property of wetting or lowering surface tension and the ability to cause the pickled steel to develop a bright, smut-free surface, it is reported. The compounds are said to attack only the scale to any great extent. Another advantage is reduction of hydrogen embrittlement and decreased hazard because less spray is produced.

Carbon Brush Kits

PRODUCTION of carbon brush kits, the No. 9 for small motors and kit 35-A for popular types of general purpose motors, has been announced by *Ohio Carbon Co.*, 12508 Berea Rd., Cleveland 11. In kit 9 all brushes are 1 in. long, but can be reduced to the proper length by grinding, filing or sawing. Total contents include 168 brushes, 40 springs, 10 wicks. Kit 35-A contains a total of 32 items or 104 single brushes and 28 pairs. They take in a range of ac motors of 1/30 to 5 hp. Units are identified by a code number on cover over compartment.

Motorized Wheelbarrow

A MATERIALS handling device known as the Prime Mover which has a capacity of 1000 lb of wet or dry materials and which is claimed to be able to climb a 20 pct grade with full load has been announced by *Bell Aircraft Corp.*, Buffalo 5, N. Y. The machine has three wheels, is operated by a 3-hp air-cooled gas engine and is designed for use with a bucket or steel and wood platform deck. Transmission, clutch and gears are enclosed and no belts or chains are used to transmit power from the engine.

Drum Carrier

A FORK lift truck accessory, the multiple drum carrier, providing safe, easy and fast handling of 1, 2, 3 or 4 drums by means of specially-designed, hydraulically operated gripping shoes has been announced by *Towmotor Corp.*, 1226 E. 152nd St., Cleveland 10. Mechanical and gravity action provide strong positive grip. Combined with Towmotor's high-stacking ability, the multiple drum carrier also permits stacking of drums to utilize overhead storage area.

WHEN *You want*

- BURNER PRESSURE, MODULATION, MULTIPLE FEED, UNIT ADJUSTMENT
- LOWER MAINTENANCE, ACCURATE OUTPUT, IN YOUR BUTANE-AIR PLANT
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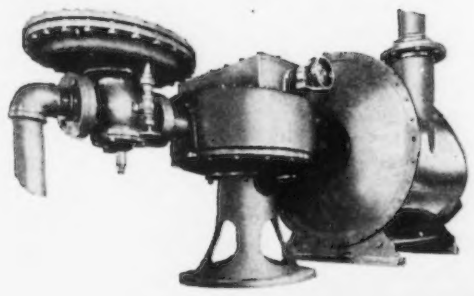
6 SIZES 4500 TO 120,000 C. F. H.!



Left to right: the Regulator reduces entering gas to 0 pressure; the carburetor mixes it with air in unchanging but adjustable proportion; the blower takes over the mixture and delivers it at desired pressure. At minimum or full capacity, automatically responding to demand, air-gas ratio is identical and fuel cost in exact proportion to heat units delivered.

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PRECISION CARBURETION + ADAPTED COMBUSTION FOR INDUSTRY'S HEAT USING PROCESSES
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Assembly Line . . . WALTER G. PATTON

• Oldsmobile presents first GM postwar passenger car . . . Pontiac boosts its capacity to 500,000 cars per year . . . Chevrolet will offer 4-speed synchro-mesh transmission on its heavy duty trucks.

DETROIT — All week huge crowds have been milling around the lobby of General Motors Bldg., where Oldsmobile's new postwar "Futuramic" models are on display. As predicted in the IRON AGE (Jan. 15, 1948, p. 94) GM's first postwar car is conservatively styled. The rear fender is less prominent than it was in prewar models, but it doesn't disappear entirely as it does in some of the new postwar cars. The Olds rear fender, incidentally, is a separate stamping.

The appearance of a long continuous fender line that is characteristic of the pontoon-type fender is used in the new GM line. However, the body is so designed that a scratch starting at the front of the car probably will not be carriod practically the entire length of the body.

The postwar Olds has the appearance of having a low center of gravity although it it not indicated that any important change in framing or spring construction was made. Glass area is greatly increased in both front and rear. A change in the size and spacing of front posts gives added vision and the cowl has practically disappeared.

Curved glass with a metal divider is used for both the windshield and the rear window. It has been reported that no important changes have been made in the gage of the metal used for the principal stampins including roofs, fenders, side panels and bumpers. However, a new technique has been used to attach molding around the windows of the car.

Overall width of the new Oldsmobile is only slightly greater than that of comparable 1947 models. However, and indicative of the ability of automobile engineers to provide larger interiors in the new car styling, the width of the *inside* front seat has been increased from 56¼ in. in the 1947 model to 63 13/16 in. in the postwar car.

TOTAL overall weight of the new car is a little less than the 1947 model which had a wheelbase that was 2 in. longer. It might be deduced from this that the number of pounds of steel used in this new Oldsmobile model may be slightly less than its predecessor models.

The hood of the new car has been lowered appreciably. The front grille has fewer and wider bars. There is larger space for air intake. Also, the shape of the grille has been altered somewhat to eliminate part of its downward sweep. Parking lights are mounted in the front fender rather than in the grille.

Stainless steel strips are provided as protection for the side of the car—something that seems to be badly needed in most postwar cars. A chromium-plated stamping protects the lower entering edge of the rear fender against damage by stones.

Bumpers are of the wrap-around type. Illuminating lights for the license plates are installed on the sides of the rear bumper guards. Hardware is conventional.

Even some of GM's competitors who saw the new car were favorably impressed with its interior styling. Most of the flashy, sun-reflecting chromium once used on automobile instrument panels has been eliminated in the new Oldsmobile in favor of a simple design. All instruments and control buttons are concentrated in a small area directly in front of the driver. The clock is mounted on the top of the panel, rather than on the door of the glove compartment. Upholstery of the models on display at the GM building this week was an unusual 2-tone material this observer has not seen before.

The Olds Futuramic is offering the car buyer a new high compression head that has boosted the horsepower up to 115, compared with 110 and 100 for the Oldsmobile Dynamic models that are being continued in production.

Prices of the postwar models are approximately 9 pct higher than those of comparable 1947 models. The price of the 1948 "face-lifted" models remains unchanged.

* * *

THE second line of GM cars to be introduced in the past 2 weeks is the new 1948 Pontiac. The new Pontiac, featuring Hydra-matic transmission, for the first time includes some fairly extensive styling changes in the grille and hood, a minor fender change, and the introduction of a new deluxe model. The new cars were put into production without creating a single open spot in the flow of new cars through the Pontiac plant, according to Pontiac engineers.

The adoption of Hydra-matic as optional equipment calls for important changes in both the frame and the floor pan of the car. Therefore, special scheduling of these parts is now required to fill the orders of about 50 pct of the Pontiac buyers who are expected to order Hydra-matic drive.

After nearly 2 years, Pontiac has now completed its expansion program which has resulted in doubling the plant's capacity as well as modernizing many of its facilities. Plant capacity is now more than 500,000 cars per year, using multiple shift operation. Total production in 1947 was 230,600 units, according to Harry J. Klinger, Pontiac general manager.

The Pontiac head indicated that 511,000 orders for new Pontiacs are now on hand. An extensive check made by regions recently indicated that 95 pct of these orders would be good if Pontiac could deliver the cars tomorrow at existing prices, according to Pontiac's chief executive.

new Bullard type "K" economies widen scope of MULT-AU-MATIC method

Higher Speeds Meet New Job Requirements. Designed to lower production costs of small and medium sized jobs in cast iron, steel and light metal alloys, the new BULLARD Type "K" Mult-Au-Matic provides a wide range of spindle speeds up to 900 rpm to get full productive capacity out of modern cutting tools.

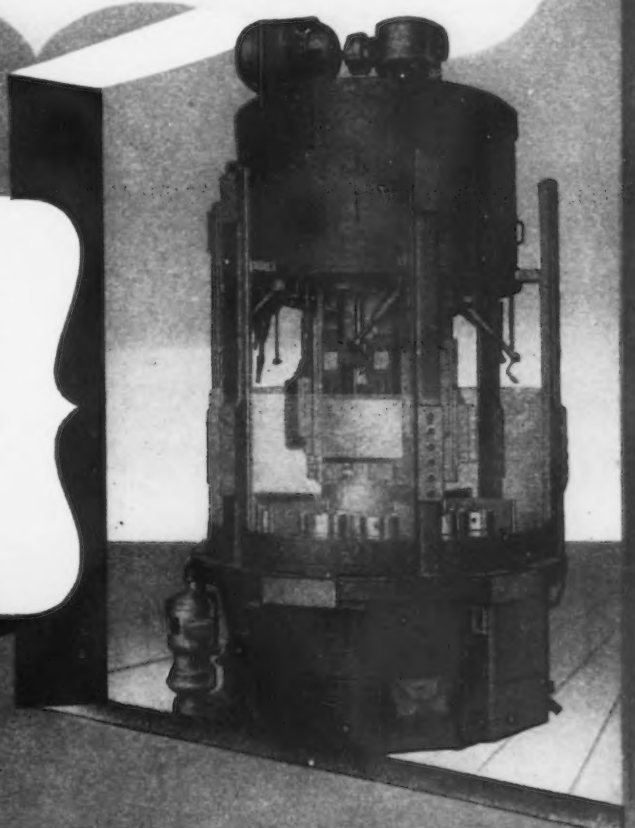
Saves Time Between Cuts. A newly developed index control mechanism permits faster return and advance of tool carrying heads and faster carrier index.

Higher Degree of Accuracy. New method of carrier index registry maintains repetitive accuracy from station to station, producing work to extremely close tolerances.

Improved Hydraulic Chucking Increases Efficiency. Work is chucked quickly by foot treadle control and automatically released as spindles return to loading station. Chucking pressure is adjustable to suit work characteristics.

Twin Spindles Double Production. Two of the four Type "K" models have twin spindles that deliver two finished pieces for every index cycle . . . a promise of lower production cost that is worth investigating further.

Write for complete information about the new Type "K" version of the Mult-Au-Matic method, one of the leading contributors to our modern American production system. THE BULLARD COMPANY, Bridgeport 2, Connecticut.



BULLARD Type "K" Mult-Au-Matics for work up to 10" in diameter come in four models: 6 or 12 spindles with speeds from 100 to 900 rpm, and 8 or 16 spindles with speeds from 98 to 880 rpm. 41 speed changes, 82 rates of feed, selective feeds and common speeds at all stations.

BULLARD

BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

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INCLUDED in the substantial Pontiac modernization program is the installation of 4½ miles of new conveyors, the building of two new 108-in. cupolas, a new sand system, the addition of 440 ft to the motor building, building a new axle plant to produce 175 differentials per hour, expansion of the sheet metal plant and the design and construction of an entirely new heat treat plant and metallurgical laboratory.

The new Pontiac cupolas, said to be the largest in the industry, will use double the normal thickness of ceramic lining to reduce down-time. An over-head system of baffling and water spray is designed to cool the exhaust gases from the cupola and virtually eliminate the discharge of ash.

The new sand reclamation system is expected to materially reduce sand purchases for foundry use.

A considerable amount of new equipment has been installed in Pontiac's new axle plant. There is a new test house for quiet-testing differentials. A new circular-type differential assembly line has replaced the old loop type. Among the new machines installed is a "Revacycle" machine for cutting side gears and pinions. Once the loading device has been filled, operation is completely automatic. Pontiac has also installed some new Lee automatic machines for special drilling and tapping. A single machine is reported to cost more than $100,000.

One of the toughest jobs Pontiac engineers had to face was moving cylinder block machines in the motor plant. These machines were so large they had to be taken apart, moved, and then set up again in the new location. The largest single expansion item was the new electroplating system which is probably the largest automatic setup in the industry. This equipment is capable of plating 11,000 individually stamped steel auto parts of 11 different designs during a 16-hr period.

* * *

NOT to be outdone by its competition which has recently announced new postwar truck models, Chevrolet is making some important "second round" changes in its new advance-design postwar trucks. A four-speed synchro-mesh transmission with the gear shifting lever on the steering column is being extended to include heavy duty as well as light trucks. Synchro-mesh has previously been available on light truck models but not on those used for heavy duty.

In its latest change, Chevrolet has installed parking brakes that are foot-operated rather than hand-operated—a safety precaution, according to Chevrolet engineers.

In its new truck power plants Chevrolet is featuring heavier and more rigid crankshafts, longer-life engine bearings and an aluminum camshaft gear that is specified for heavy duty models.

Another recent Chevrolet development is a splined rear axle attachment for wheel hubs. The new design is said to reduce the strain on the bolts, preventing loosening or breakage. Heavy duty Chevrolet truck models now have an 11-leaf spring in combination with a helper spring which brings capacity up to 15,600 lb.

* * *

Ford salaried employees who are too timid to "speak out in meeting" are being given an opportunity to bring their grievances directly to the attention of Young Henry Ford II.

A survey recently conducted by Elmo Roper, public opinion polling expert for the Ford Motor Co. indicates that salaried workers at Ford Motor Co. have three major beefs: (1) Advancement is slow and often unfair, (2) The company has failed to provide proper benefits to company employees, (3) Employees are not treated as human beings.

In written response to Ford questionnaires, salaried employees said that slow and unfair advancement is the reason why 39 pct of Ford employees leave the company.

The employees suggested three steps could be taken to improve Ford's present benefit policies for employees. The first request was for an improved retirement plan. The second improvement suggestion was for a system of priorities and discounts on new Fords. The third request was for an improved vacation plan.

The Ford "no smoking" ban, then in effect, was cited as the No. 1 gripe as far as company rules were concerned.

ANOTHER complaint of Ford employees, and which was expressed by 41 pct of the employees polled, was that they were being treated as numbers on the payroll, rather than as human beings.

Asked if they would come to work at Ford's if they had to do it over again, 68 pct of the salaried workers said "yes" and 67 pct of the foremen said they also would choose Ford again.

When asked if Ford's is now a better place to work than 5 years ago, 82 pct of the salaried workers and 73 pct of the foremen said "yes."

Although many complaints were received by Ford management in its efforts to determine the attitude of employees, the average Rouge salaried worker believes his best chances for the future rest with the company.

Commenting on the results of the salaried employees' poll, Henry Ford II said, "Results of this survey show that we have a big job still ahead of us to improve conditions and relations among all of us.

"In addition to the steps already taken, such polls will continue to discover the frank opinions of our employees. Our employees' information program . . . will be extended to let all employees know what we are doing and why we are doing it, and how it will affect them.

"Results of this poll are being carefully studied to help us in working out corrective action."

Auto Output Hit By Cold Weather

• • • Automobile output during the last week in January was hard hit by the second interruption of industrial gas service furnished by Michigan Consolidated Gas Co. Last Monday many Detroit workers were laid off by curtailment in natural gas supply. Hardest hit were the Chrysler plants where 50,000 of the company's 70,000 Detroit employees were affected. All Chrysler assembly lines except Dodge Truck plant have been affected.

Packard's assembly line as well as the Ford truck line at Highland Park have ceased production. Many employees of Briggs Mfg. Co. and Chevrolet Gear & Axle were also laid off. Meanwhile, operations of Ford's Rouge plant and the plants of Hudson and Kaiser-Frazer have been continued. The General Motors' Cadillac plant has been closed for a model changeover.

● In our world of tomorrow that soon will be today, beauty plays a new and leading role. For modern designers have found beauty has in it the essence of utility. Auto-Lite's great Bay Manufacturing Division reflects the importance of this new trend. Here under one roof are the technical skills and production capacity for a new art rendered in plastics including brilliantly colored elastomeric plastics, decorated metals and metal-plastic combinations. The artistic skill of Auto-Lite's Art and Style Division is available on matters of design and development.

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Washington . . . .

EUGENE J. HARDY

• Employee-benefit plans in basic steel analyzed . . . Extent is widespread . . . Life insurance most common type of benefit . . . Employees finance most plans.

WASHINGTON — Employee-benefit plans have been widely accepted in the basic steel industry, according to a recent study of such plans issued by the Social Security Administration. The report analyzes 50 employee-benefit plans in operation in mid-1947 in the establishments of 36 firms in the basic steel industry covering about 75 pct of total employment.

The study is the first in a series designed to ascertain the extent and character of existing industrial, health, welfare and retirement plans in major industries. In addition to an analysis of the 50 plans, the report also presents an appendix outlining the details of each plan in operation in specific companies.

The basic data was obtained initially from the United Steelworkers of America and later verified or corrected by members of the industry.

The 50 plans in operation in the steel industry included eight different types of benefits: life insurance, accidental death and dismemberment, sickness and accident, hospitalization, surgical care, retirement, medical care, and burial. Life insurance was the most common type of benefit. Of the 50 plans analyzed, 44 provided life insurance benefits in firms having 95 pct of the employment (428,100 persons) included in the study.

At the other end of the scale it was found that medical care was available in only one of the 50 plans —that of a firm employing only 1800 persons in basic steel operations. In regard to coverage, the report points out that the coverage under each of the different types of benefits was actually smaller than that indicated by employment figures. This is due primarily to a wide variety of eligibility requirements and the voluntary nature of most of the plans. This situation was especially true with respect to retirement plans where the eligibility requirements and the benefit formulas probably brought the coverage down to approximately 200,000 out of the 316,000 persons employed in the establishments.

COMBINATIONS of benefits were provided in all plans but two. No plan provided all of the eight types of benefits. The most complete plan included life insurance, accidental death and dismemberment, sickness and accident, hospitalization, surgical, retirement and burial benefits and involved at most 400 employees. The two plans providing only one type of benefit each were: one plan providing only group life insurance, and another only a retirement plan. The employment involved here was 1000 and 1500 respectively.

No particular combination of benefits can be cited as the most common, according to the study. While the same combination, life insurance, sickness and accident, hospitalization, and surgical benefits, was found in six different plans, these involved at most only 10,750 employees. Only four plans in establishments employing 18,450, included life insurance, accidental death and dismemberment, sickness and accident, hospitalization, surgical and retirement benefits.

With considerable agitation in labor union circles for retirement benefits, the portion of the study concerned with this type of benefit is of particular interest. Of the 36 firms in the basic steel industry whose employee-benefit plans were analyzed, 13 maintained company-wide retirement plans. These

Number of employee-benefit plans and employment in establishments covered, by type of benefit provided (50 employee-benefit plans in the basic steel industry)

	Other than U. S. Steel Corp.		*U. S. Steel Corp.*	
Type of Benefit	*Number of plans*	*Employment*	*Number of plans*	*Employment*
Total	43	268,100	7	160,000
Life insurance	37	247,400	7	160,000
Accidental death and dismemberment	13	73,400	2	10,400
Sickness and accident	34	242,850	4	20,700
Hospitalization	34	176,700	6	25,700
Surgical	19	77,750	4	16,200
Retirement	13	156,300	7	160,000
Medical care	1	1,800	..	.....
Burial	9	47,750	2	8,900
Dismemberment only	2	19,300	..	.....

The plans established by the U. S. Steel Corp. and its subsidiaries have been segregated from the others. This was done, according to the study, because data were available for only six of the considerable number of employee-benefit associations which have been set up in the Corporation. Thus, the study continues, there is no doubt that the number of employees in establishments of the U. S. Steel Corp. in which employee-benefit associations provided sickness and accident benefits, for example, was many times the 20,700 shown in the table.

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firms employed approximately 316,300 people—or almost 80 pct of the employment covered by the survey—and had 20 of the 50 employee-benefit plans.

The 13 retirement plans included seven noncontributory plans, or plans entirely financed by the employers of which two were profit-sharing plans; four contributory plans, or plans financed jointly by the employers and the employees; and two plans, each having a noncontributory system covering all employees; regardless of occupational or earnings classifications, who met certain requirements, supplemented by a contributory system for certain employees with earnings exceeding $3000 annually.

NOT all of the 316,300 employees, however, were covered under these retirement plans. The eligibility requirements for participation under them, the qualifications for benefits and the provisions for offsetting the benefits under government retirement plans—such as those of the Railroad Retirement and Social Security Acts—left a large number of these employees uncovered. For example, the plans of only three firms provided coverage for all of the 84,050 persons they employed. One firm, Jones & Laughlin Steel Corp., employing 26,200 employees in basic steel, is reported as maintaining a noncontributory plan which covered all full-time employees, and, in addition, a contributory plan which covered those of its salaried employees whose earnings exceeded $3000 annually and who had served with the company for at least 2 years. Similarly, the U. S. Steel Corp., with 160,000 employees in basic steel is reported as maintaining a noncontributory plan covering all employees and a contributory plan for employees with earnings in excess of $3000.

In all plans, except one, the normal retirement age was 65. The exception was the noncontributory plan of The Wheeling Steel Corp., which covered all employees and specified 70 as the normal retirement age, but provided that an employee with 20 years' service could retire voluntarily at age 65.

Specific provisions for earlier or delayed retirement were found in all the contributory plans. These permitted retirement at reduced pensions as early as age 55, or in one case, at age 60. In addition, one plan required 20 years' continuous service, another 15 years if benefits were paid before the normal retirement age. Two noncontributory plans permitted retirement as early as age 55 in disability or hardship cases. In other noncontributory plans, earlier retirement was regarded as a termination of employment prior to retirement and the extent of the benefit depended on the rights in the employer's contributions vested in the employee. All the plans provided that, with the approval of the employer, an employee could remain in employment after normal retirement age.

AS TO financing, practically all plans were financed in the main by the employees. Only two of the 50 plans were financed entirely by the employers. Six plans were operated by employee-benefit associations and, except for the fact that the employers bore some part of the administrative costs, were wholly financed by the employees. The other 42 were financed jointly by the employers and employees.

Fourteen of these jointly financed plans consisted of contributory employer-sponsored and employee-benefit association programs complementing each other. In these plans, as in all contributory group insurance plans, the employees contributed the major portion of the insurance premiums and the full cost of the benefit association programs. In some of the plans which provided group insurance as well as retirement benefits, the employees contributed only toward the group insurance premiums, the employer financing the full cost of retirement benefits. In others, the employees contributed toward the entire program.

In all employer-sponsored group insurance plans, the employers assumed the entire administrative expenses. In one self-insured plan, the benefits were intended to be financed entirely through employee contributions, while the employer assumed all the administrative costs and any deficit which might arise under the plan.

Administration of the plans varied. The method occurring most frequently in the 50 plans is joint employer and insurance carrier administration, 28 falling within this category. Employee benefit associations were involved in 18 plans of 12 firms. One group insurance plan and five pension plans were wholly employer administered.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

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NEW FALSE TEETH, BIFOCAL GLASSES AN' ARCH SUPPORTS MUST MAKE YOU FEEL NOT QUITE YOURSELF!
YOU AIN'T YOURSELF! A GUY WITH ALL OF THEM PIECES DON'T KNOW WHUT MINUTE HE MIGHT GO TO PIECES!
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West Coast . . .

ROBERT T. REINHARDT

• Installation of facilities to produce hot-rolled sheets to begin this month at Geneva . . . Seattle feels slight easing in sheet market . . . Potential large sheet user surveys Los Angeles area for plant site.

SALT LAKE CITY—Barring labor trouble and acts of God, West Coast steel users will be fabricating hot-rolled sheets from the Geneva steel plant by the end of 1948.

Announcement by Dr. Walther Mathesius, president, Geneva Steel Co., last week that construction of new facilities to produce light gage coils is to start this month, was welcomed with enthusiasm by western steel users.

This long anticipated conversion of Geneva's facilities has repeatedly been delayed because of the unavailability of some machinery and equipment. The principal additions involved in extending the present plate mill for sheet production include two 4-high, 132-in. Mesta rolling mill stands; two Mesta downcoils and Link Belt coil conveyer equipment. Width of the coiled sheets is limited by the 80-in. width of the coilers to be installed. No announcement has been made as to gage range but it is assumed that it will be complete for hot-rolled sheets.

Dr. Mathesius stated that during and after the mill extension there will be no change in plate dimensions or tolerances and that production of both shapes and plates will continue during and after the conversion operation.

The present plate mill is a 132-in. Mesta semicontinuous, 4-high consisting of spreading stand (4-nigh); 4-high reversing rougher and four, 4-high continuous finishing stands.

Annual capacity of sheared plate of this mill is rated at 700,000 net tons and while no official statement has been made as to the capacity of the continuous sheet mill when completed, it is believed it will approach 60 pct of plate capacity.

This addition to Geneva's facilities is the first major step in the conversion program which U. S. Steel Corp. announced it would undertake at a cost of approximately $18,600,000 when it purchased the plant from the United States government in June 1946.

As was previously announced in THE IRON AGE, hot-rolled coils for reduction at Columbia Steel Co.'s new cold mill at Pittsburg, Calif., will come from the Tennessee Coal, Iron & Railroad Co. at Birmingham until the Geneva facilities are producing. The Pittsburg mill, now scheduled to start operations in May or June, is to have a capacity of between 300,000 and 500,000 tons of cold reduced sheets and tinplate annually and the recently announced cold reduction mill for the Los Angeles area is to have a similar capacity. When Geneva is operating fully, it is believed this U. S. Steel Corp. subsidiary should be able to keep the two California reduction mills supplied.

Whether Geneva Steel Co. must pay a Utah sales (or use) tax on its purchase of the steel plant is now up to the State Supreme Court to decide. Company and state officials had reached an amicable agreement that the issue should be settled by a judicial decision rather than by administrative ruling of the Tax Commission. The Attorney General previously wrote an opinion holding that part of the sale was subject to the use tax.

SEATTLE—While the evidence is not conclusive or developed on a broad enough base to indicate a positive trend, there are signs which indicate a slight easing up in the steel sheet market.

Several small metal users are more optimistic at this time than they have been for many months. Kenworth Motor Truck Corp., one of the more important metal buyers, reports that sheet metal and parts are flowing steadily into their plant and that production is now nearing 75 pct of capacity with the greatest improvement being evidenced in the last few months.

With this encouragement, the company indicates that business for the next 6 months looks at least as good as that they enjoyed during the last 6 months of 1947 when they set an all-time production record. Although company officials would not reveal their total backlog of orders, they do state that they still have on their books approximately one third of the $4½ million order for trucks designed and built especially for use in the desert.

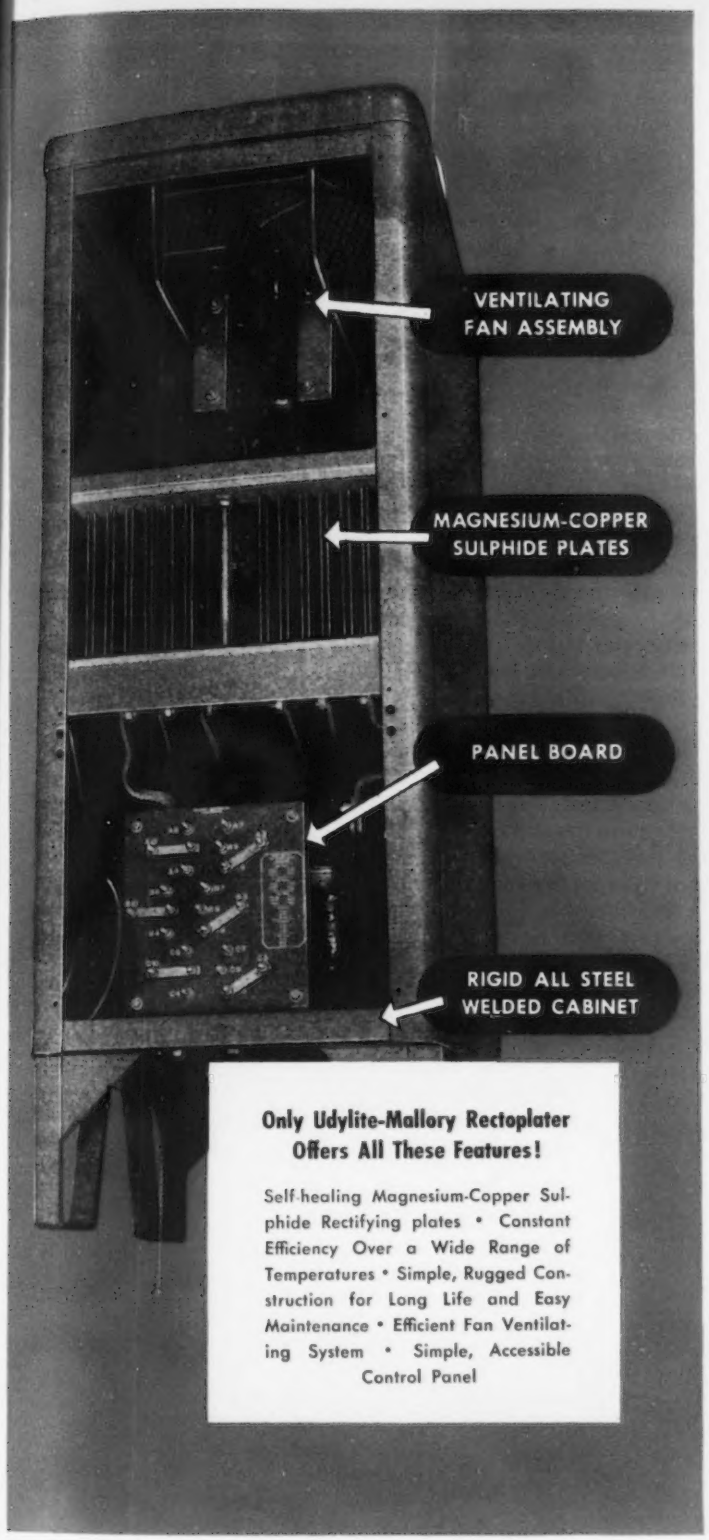
This truck contract with the American Oil Co. is giving the company valuable experience in the heavy truck field and four service engineers are in Arabia working at both ends of the pipeline being built there. These men are assigned to collect data on the performance of these heavy trucks under desert conditions and to iron out any "bugs" which may develop.

Similar optimistic reports have come from manufacturers of water heaters, stoves and sheet metal-working shops. No one is stating that the drought is broken but there apparently are encouraging signs.

BOEING AIRPLANE CO. continues to operate at a peacetime high and last week sent the first of three YC-97A Stratofreighters on its maiden flight.

This ship is the transport counterpart of Boeing B-50 Super Fortress and the Army has ordered three. It is reported that the ships will be put into service by the Air Transport Command to augment its present fleet of earlier type Boeing Stratofreighters.

This huge ship has a wingspan of 141 ft and is 110 ft long and weighs 135,000 lb. The company reports that it has 59 pct more power than the prototype XC-97 which flew nonstop from Seattle to Washington on Jan. 10, 1945, at an



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Industrial leaders of the area in preparing for the usual labor contract negotiations that come up each spring with the flowers, are realizing that they face some extremely heavy demands.

The automotive mechanics received their demands of 25¢ an hour after a 6-months long strike and now the job shop printers are on strike demanding a $15 a week increase which would raise their salary from $75 for a 35-hr week to $90 for the same period. On top of all this, the bus drivers of Seattle's transit system are demand a 44¢ an hour increase which would raise their pay from $248.50 a month to $325, or an increase of $76,50 a month.

Boeing Airplane Co. has sent its Aeronautical Mechanics' Union a new proposal, the details of which are secret.

Informed observers of the general labor situation report that there is a general feeling among most of the mechanical labor groups that their demands should be for at least increases of 25¢ an hour. Apparently labor has little conception of the effect of wage increases on prices and costs of living. The attitude of, "if the company can't bear the increase they merely have to raise the price of their goods to cover," is often expressed.

LOS ANGELES—Both steel producers and users of sheet metal in this area are more than just a little interested in current rumors that officials of the U. S. Gypsum Co. have been investigating the possibilities of building a plant here to produce expanded metal lath in quantities variously reported as from 15,000 to 40,000 net tons per year.

Local U. S. Gypsum officials deny knowledge of such a venture, but it is known that officials have been surveying conditions here with a view to putting in such a plant. It is understood that the tonnage requirements of this operation would be confined to cold-rolled sheets, 24 to 30 gage.

Assuming that such an operation would utilize only 30,000 tons of such sheets per year, this figure represents approximately 10 pct of the total sheet consumption of the seven western states in the prewar era. However, it is believed that even if started now, such a plant would not be in the market for sheets for at least a year or perhaps longer, at which time Bethlehem-Pacific Coast Steel Corp. and Columbia Steel Co. will undoubtedly be in a much more favorable position to supply demands.

While new industries continue to seek sites in this area, there are many already established here who look forward to 1948 with considerable uneasiness about the distribution of their products, according to L. A. Johnson, president of the California Manufacturers Assn. and president of the National Motor Bearing Co., Inc., of Redwood City, Calif.

IN reviewing some of the problems of western manufacturers, Mr. Johnson was of the opinion that while the cost of distribution has mounted rapidly along with other factors, percentage increases in freight rates are greatly affecting the ability of manufacturers who are distant from great markets to compete in those areas.

"The fundamental requirement of the American mass production system is adequate cheap transportation which can place volume produced goods in faraway markets at savings to consumers. Unpredictable increases in freight charges, particularly percentage increases, are in direct opposition to this fundamental," Mr. Johnson said.

Mr. Johnson anticipates major economic changes in production and distribution conditions which may be of temporary benefit to a substantial number of California manufacturers who may now use this situation to get established in many production industries. On the other hand, Mr. Johnson indicated that these economic changes will seriously affect the ability of some other California manufacturers to maintain their hard won competitive position in national markets.

Another contract for Canadian coking coal has been negotiated with Boeki Cho of Japan, according to the Yaras & Co., which involves the shipment of approximately 54,000 metric tons in addition to the 30,000 tons announced in THE IRON AGE, Jan. 22.

First shipment on the earlier contract was made from Seattle on Jan. 5 and the first on the second contract left Seattle Jan. 19.

There is still no information available as to whom the 25,000 metric tons of hot-rolled and galvanized sheets which this company is importing from Japan will be sold.

NEW TECHNIQUE: *An automatic, hydraulic lumber truck unloader arm has been announced by a Calif. company. The use of unloader arm "allows lumber loads to be deposited exactly where they are wanted (even on carrier blocks) without the customary thunderous crash and costly breakage." The device can be installed on any lumber truck.*

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PERSONALS

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• **Charles S. Munson,** formerly president of Air Reduction Co., Inc., New York, has been elected chairman of the executive committee. He is succeeded by **John A. Hill,** who becomes president of the company. **William C. Keeley,** formerly vice-president, has been elected chairman of the newly-created finance committee.

• **J. N. Lind** has been promoted to assistant general traffic manager of the National Supply Co., Pittsburgh. He started with the company in 1926 as a clerk in the traffic department, Ambridge. He served as assistant traffic manager, Spang-Chalfant Div., from 1937 until 1945 when he was promoted to traffic manager of the division.

• **Clifford C. Tippit,** formerly a methods supervisor with the Reliance Electric & Engineering Co., Cleveland, has become manager of a newly-created order and planning department.

• **Arthur J. Wieland** has been elected to the newly-created post of executive vice-president of Willys-Overland Motors, Toledo. Mr. Wieland has been vice-president in charge of distribution since 1946, when he came to Willys-Overland from General Motors.

ARTHUR J. WIELAND, executive vice-president, Willys-Overland Motors

• **Tom L. Parker** has been appointed manager of the warehouse branch and district sales office at Philadelphia of Columbia Steel & Shafting Co. and its divisions, Edgar T. Ward's Sons Co. and Summerill Tubing Co. He succeeds **R. C. Cowan,** who has been transferred to the managerial position at Syracuse. Mr. Parker has been with these companies for 11 years. The past 8 years have been devoted to sales work in Philadelphia and Detroit with an interim period during the war as special representative for the Summerill Div. The last 4 years Mr. Parker was manager of all three divisions at Detroit.

• **J. Albert Robinson** has been named purchasing agent for the Standard Tube Co., Detroit. Mr. Robinson, during the war, served in administrative capacities in the steel divisions of U. S. Maritime Commission and War Assets Administration at Washington. Prior to Washington he had been connected with Youngstown Sheet & Tube Co. and Allegheny Steel Co.

• **Merle J. Graham** has been named manager of the West Leechburg, Pa., plant of Allegheny Ludlum Steel Corp. **Frank G. Benford** has been appointed assistant plant manager. Mr. Graham joined the company in 1933. After 8 years in the service departments he was named production manager of the plant operated by the company during the war at Dunkirk, N. Y. In 1946 he was made assistant manager of the West Leechburg plant and was named acting plant manager early in 1947. Mr. Benford worked as a metallurgist for General Electric Co., Schenectady, for 11 years prior to joining Allegheny Ludlum as chief metallurgist of the West Leechburg plant in 1945.

• **A. W. Steudel** has been elected a director of Republic Steel Corp., Cleveland. He is president, the Sherwin-Williams Co., a director of the Sherwin-Williams Co. of Canada, Ltd., the Baltimore & Ohio R.R., the Cleveland Trust Co., and Wilson & Co.

• **Leo H. Fait** has been elected secretary of Dietrich Bros., Inc., Baltimore, succeeding the late **Walter D. Barnes,** secretary and assistant treasurer.

C. W. IAMS, JR., assistant to executive vice-president, Firth-Sterling Steel & Carbide Corp.

• **C. W. Iams, Jr.,** has been named assistant to James W. Kinnear, Jr., executive vice-president of Firth-Sterling Steel & Carbide Corp., McKeesport, Pa. Mr. Iams has spent 12 years with Carnegie-Illinois Steel Corp. in the industrial engineering department at Homestead, Clairton and Irvin. For the past 4 years he has served as district industrial engineer, Pittsburgh district.

• **Roman F. Arnoldy** has been elected president and general manager of Houston Heat Treating Co., Inc., Houston. Mr. Arnoldy was formerly a development engineer with Union Carbide & Carbon Research Laboratories.

• **Maurice J. Hoke** has been made works manager of the crankshaft and camshaft divisions of the Ohio Crankshaft Co., Cleveland. Mr. Hoke came to Ohio Crankshaft in 1945 to work on special assignment in the company's new products division and in 1946 was named chief engineer. **Alfred H. Schott** has been promoted to the position of master mechanic. He came to Ohio Crankshaft from Hickok Instrument Co. in 1941, where he had been in charge of inspection. His first job at Ohio was as foreman of inspection. In 1942 he was made process engineer of the company's aircraft division, and in 1945 was placed in charge of production engineering for the crankshaft and camshaft divisions.

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KAYDON Bearings are helping to "make dreams come true" for designers of modern machinery now making the most of the technological advances of the past several years. Heavy-duty machines capable of greater speed, heavier loads, greater precision in performance, longer life . . . machines capable of greater production at lower costs . . . are being engineered with KAYDON bearings.

The KAYDON line is so complete, with such a broad line of types and sizes of ball and roller bearings . . . from 4" bore to the unusually large 120" outside diameter bearings . . . that many former handicaps to design are now removed. KAYDON Bearings have become known as the line that helps designers say: "It CAN be done!"

KAYDON also offers manufacturers of precision parts the following modern facilities and services: Atmospheric controlled heat treating, precision heat treating, salt-bath and sub-zero conditioning and treatment, microscopy, physical testing and metallurgical laboratory services. • Counsel in confidence with KAYDON. Engineers who are specialists in modern bearings will gladly cooperate with your organization.

KAYDON *Types of Standard or Special Bearings.*
Spherical Roller • Taper Roller
Ball Radial • Ball Thrust
Roller Radial • Roller Thrust

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LLOYD R. COOPER, director of research, Heppenstall Co.

• **Lloyd R. Cooper** has been named director of research for Heppenstall Co., Pittsburgh. Mr. Cooper joined the Heppenstall-Eddystone Corp. in 1942 as engineer of tests and was appointed acting director of research of Heppenstall in 1946.

• **Edward C. Strandine** has been named International Business Machines Corp. district sales manager with headquarters in Albany, and **Thomas A. Kirkland,** district sales manager with headquarters in Atlanta. Mr. Strandine joined the company in 1930 and Mr. Kirkland joined in 1929.

• **Russell G. Ford** has been appointed general purchasing agent for the Chevrolet Motor Div., Detroit. Mr. Ford has been with Chevrolet for the past 26 years. **G. M. Haley** has been named assistant purchasing agent of the central office. **E. J. Furbacher** has been promoted from senior buyer to assistant purchasing agent of the central office.

• **Walter F. Garlow** has been named advertising manager of the Hewitt Rubber Div. of Hewitt-Robins, Inc., with headquarters in Buffalo. He formerly was director of advertising and supervising engineer for Matco Products, Inc., and from 1936 to 1941 was in charge of advertising and sales promotion for Gift Headquarters, Inc., of New York.

• **A. E. Carter** has been named works manager of the newly-acquired automobile manufacturing plant of Nash Motors of Canada, Ltd., in Toronto. For the last 2 years he has been managing director of the Kelvinator, Ltd., refrigerator plant near London, England.

• **James M. White,** vice-president in charge of manufacturing for Allis-Chalmers Mfg. Co., Milwaukee, has resigned but will remain as an adviser to president Walter Geist for several months.

• **Cecil W. Brown,** general sales manager of the Le Roi Co., Milwaukee, has resigned to accept the position of general sales manager of the Carson Machine & Supply Co., Oklahoma City, Okla.

• **Charles A. Avant** has been appointed district sales manager for the Washington district, Youngstown Steel Products Co., representing Youngstown Sheet & Tube Co. He has been in the Washington office for several years.

• **J. Robert Pauline** has been appointed works manager for the Kellogg Div. of the American Brake Shoe Co., New York. Mr. Pauline, formerly assistant to the vice-president in charge of operations and engineering, has served in various supervisory capacities since 1943 when he first joined Brake Shoe as an engineer. Prior to 1943 he was connected with the Burnham Boiler Corp. in Irvington, New York. In his new position he will continue to be located at the division headquarters in Rochester, N. Y.

• **Richard J. Joyce** has been appointed purchasing agent for Indianapolis plants of the Link-Belt Co., with headquarters at the Ewart plant. Mr. Joyce succeeds **Frank C. Thompson,** retired, who had been employed by Link-Belt since 1906. Mr. Joyce began working for the company in the foundry office at Indianapolis in 1917. He was employed in the purchasing department, in sales, stores and material handling from 1919 to 1947, and has been assistant purchasing agent since that time.

• **Robert H. Fuller** has joined the H. K. Ferguson Co., New York, as a contract engineer in the eastern district. Mr. Fuller has been associated with Pan American Airways for the last 7 years in a supervisory engineering capacity.

• **W. F. Gow,** director and works manager of Norton Co. abrasive division, Worcester, Mass., has been elected to the new post of executive vice-president. **John Jeppson,** assistant secretary and foreman, has been made a director.

• **W. S. Hall,** formerly chief engineer, Chicago district of Carnegie-Illinois Steel Corp., and **R. B. Gerhardt,** formerly chief engineer of construction of Bethlehem Steel Co., have become associated with United Engineers & Constructors, Inc., as consulting engineers. Mr. Hall will be resident in Chicago and Mr. Gerhardt will make his headquarters in Philadelphia.

• **George E. Richardson** has been named assistant to the manager of the feeder division, Westinghouse Electric Corp., Pittsburgh. He is a veteran of 17 years with Westinghouse.

• **E. George Hartmann** has been appointed general sales manager of John A. Roebling's Sons Co., Trenton, N. J. Mr. Hartmann has been associated with the Roebling Co. since 1940.

E. GEORGE HARTMANN, general sales manager, John A. Roebling's Sons Co.

• **Mark A. Clements** has been appointed general service manager of Caterpillar Tractor Co., Peoria, Ill., to succeed **D. O. Nash,** who has resigned to become associated with the Wortham Machinery Co., where he will serve as vice-president and general manager. Mr. Clements, who has served since 1946 as western division service manager, has been with the company since 1936. **J. Dean Uhll,** who has been central division service manager, has been transferred to succeed Mr. Clements at San Leandro, Calif. Succeeding Mr. Uhll is **Ellsworth M. Iverson,** who joined the company in 1937 and has served in service engineering, as a field representative in the eastern division, in service publications and training and as a service engineer. His post as service engineer has been filled by **T. M. Fahnestock,** a mechanical engineer associated with service engineering since 1937.

• **Randall L. Kamischke** has been appointed New York State representative for the U. S. Broach Co., Detroit. Prior to his appointment he served the company as chief engineer during the past 3 years.

• **Charles P. Collins** has been elected president and a director of Norma-Hoffmann Bearings Corp., Stamford, Conn. He was formerly secretary and general counsel of SKF Industries, Philadelphia.

CHARLES P. COLLINS, president and director, Norma-Hoffmann Bearings Corp.

• **Thomas W. Cox** has been named assistant secretary of the Pennsylvania Salt Mfg. Co., Philadelphia, following the retirement of **U. Grant Beath,** assistant secretary and assistant treasurer, after 47 years' service with the company. Mr. Cox, who joined Pennsalt in 1903, has been an assistant treasurer since 1944. He will continue as an assistant treasurer in addition to assuming his new post. **Stanley L. MacMillan,** who is in charge of the department's cost accounting, has been appointed an assistant treasurer; and **Joseph Doherty** has been made credit manager of the company. Mr. Beath had also functioned as credit manager. **E. J. Harrington, Jr.,** an assistant treasurer, will act as manager of the sales accounting division.

• **Otto P. Bereit,** for the past year comptroller of the Parker Appliance Co., Cleveland, has been elected treasurer and comptroller. In his new position he relieves S. B. Taylor of the duties of treasurer which he had carried in addition to his responsibilities as president.

• **Gertrude Bailey** has been added to the staff of the department of industrial and public relations, Monsanto Chemical Co., St. Louis. Miss Bailey will be the department's New York representative. She formerly was associated with the William Esty Advertising Co.

• **Charles A. Oostdyk** has resigned as vice-president in charge of purchasing for Hudson Motor Car Co., Detroit. **G. W. Munger** has been named to replace Mr. Oostdyk. He has been in Hudson's purchasing department since 1932.

• **Robert L. Gibson** has been named manager of a newly-created personnel division of the General Electric Co.'s chemical department, Pittsfield, Mass. He also will continue as manager of the advertising and sales promotion division. Assisting Mr. Gibson will be **Everett W. Bickford** as manager of union relations, **George M. Hartley** as supervisor of planning and preparation, **Karl B. McEachron, Jr.,** as manager of educational activities, and **Arthur G. Sanford** as manager of personnel services and safety.

LACHLAN MACKENZIE, president, Eastern Stainless Steel Corp.

• **Lachlan Mackenzie** has been elected president of the Eastern Stainless Steel Corp., Baltimore, to replace John M. Curley. Mr. Curley, however, will continue as chairman of the board and president of Eastern's subsidiary, Industrial Steels, Inc., Cambridge, Mass. **W. T. Swomley** has been elected treasurer of the corporation. Mr. Mackenzie has been connected with Eastern since 1944 in the capacities of assistant to the president and executive vice-president. Mr. Swomley has been associated with Eastern since 1943 in the capacities of chief accountant, assistant secretary and, most recently, secretary-comptroller.

• **James B. Porteus** has resigned as president of the Sterling Engine Co., Buffalo.

OBITUARY...

• **Paul E. Winkler,** 48, purchasing agent for the A. O. Smith Corp., Milwaukee, died Jan. 19. He had been with Smith for 23 years.

• **Neal S. Baldwin,** 38, assistant to the general manager of industrial sales, the Sherwin-Williams Co., Cleveland, died Jan. 17.

• **William B. Simpson,** 72, chairman of the board of A. M. Castle & Co., Chicago, died Jan. 13.

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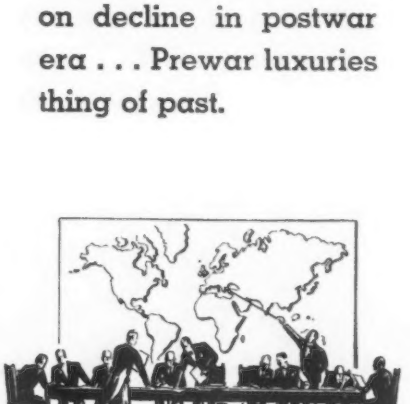
European Letter . . .

• British standard of living for professional man on decline in postwar era . . . Prewar luxuries thing of past.



LONDON—If the middle class is, as used to be said, the backbone of the country, then Great Britain is rapidly becoming invertebrate. In a sense, of course, the middle class is expanding and extending itself, as the wage-earner assumes bourgeois social habits and standards and the old upper class sheds inherited wealth and exclusiveness; and as it expands, so it grows less definite and homogeneous. Financial status, accent, habits and educational background no longer coincide.

But the essential core of the middle class, the spinal cord in the backbone, the professional man as distinct from the profit-maker or wage-earner, does constitute a fairly recognizable social type. He holds a University degree, a qualification from a professional body, or at least he has gone through a recognized process of training extending over anything up to a dozen years beyond the legal school-leaving age.

He lives on salary or fees, not on property. Until fairly lately his income, averaged over his working life, was—even allowing for his late start—much higher than that of the manual or clerical worker; now the overlap is so considerable that the distinction is blurred.

But if the class itself is hazy at the edges, both socially and economically, its particular role is less so. In a very real sense it is to the body politic what the spinal cord and central nervous system are to the physical body. A well-developed professional class distinguishes the civilized community as a well-developed nervous system distinguishes the higher animals.

The professional man presumably has the usual dose of original sin to contend with; but professional training is calculated to check the hypertrophic acquisitive instincts of Economic Man, to widen civic horizons, to substitute for the grudging calculus of pay and effort the more generous ethic of the Scriptural second mile. It is, indeed, partly because of this attitude that the professional class as a whole now finds itself in such straits. It is too proud to fight; too proud, certainly, to enter wholeheartedly into the inflationary game of mutual blackmail.

THE statistical evidence of its decline is striking. It is estimated that the real net level of wage earnings has risen by between 10 and 35 pct since before the war. But a corresponding figure for the representative salary income would show a loss of anything from 20 to 30 pct in real net purchasing power. This is partly because the prices of those goods and services which are outside the scope of the cost-of-living index, and affect the middle-class consumer more than the wage-earner, have far outstripped those which the index subsumes.

Out of any extra money income he may now be receiving the professional man must pay house-rent (unless he is lucky enough to have established prewar occupancy) at three or four times the prewar rate.

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His car, if he can run it, costs twice or three times as much new, up to ten times as much second-hand. Where the twentieth part of a $3200-a-year salary would pay for a general maid, a full fifth is now needed. School fees are largely a matter of transfer between members of the professional class and their rise has been braked by that class's forbearance; but the pressure of other costs has forced them up faster than salaries in general.

Without drawing on capital, the possession of which is by no means characteristic of the professional, it is now impossible for less than, say, $4800 a year at least, even leaving prohibitions out of account, to enjoy the normal ingredients of a prewar professional family's life—the privacy implied for each member of the family by having a room of his or her own, the mobility and independence implied by a car, the leisure implied by even a part-time domestic—not to mention such other attributes of civilization as concerts, theatres, books, the exchange of hospitality, and a modicum of foreign travel.

It is impossible for such a family to give more than a single child the type of education they prefer—and which is still almost a conventional necessity. Whether it is rightly or wrongly so is another story, and a very long one; but the fact is that many professional and middle-class families would rather stint themselves on other things than accept the state's free education.

A CURSORY survey of salary scales shows that only a tiny minority, at the peak of their careers, attain or surpass the level of $4800. The outstanding successful lawyer or doctor can, of course, do much better; so, occasionally, can the independent architect whose percentages benefit automatically from each rise in building costs; on the fringes between the professions and business, large incomes are possible to the scientist, the technician, the publicist, the accountant and the professional manager.

But the teacher, the university don, the civil servant or local government official, the social worker, the salaried doctor, scientist, architect or surveyor, the holder of His Majesty's commission, and above all the clergyman of almost any denomination, are otherwise placed. In academic life, one must be a full professor to surpass this figure—and few universities pay even their most distinguished members more than $6000 a year. In teaching, the new Burnham scale pro-

vides a maximum, for the most highly qualified assistant teacher of $2460. The civil servant must reach the rank of assistant secretary to pass the $4800 mark by any noticeable margin. And everywhere, the loss relative to living costs and to the incomes of the rest of the community is heaviest in the upper reaches. The maximum salary of an assistant secretary, for instance, remains unchanged at $6800; that of a principal is up by only 10 pct.

THERE are temporary mitigations. Just as any given wage scale stands for higher earnings, thanks to full employment and overtime, so any given salary scale looks better to the present-day professional man because of the quick promotions of the last few years. If one has climbed three or four steps in half the usual time, one is less apt to notice that they are steps on a down-going escalator. But this very record of quick promotions darkens the prospects for today's juniors. The places at the top are now occupied not by seniors soon to retire but by men with 20 years' tenure ahead of them; there are likely to be some starving horses while the next crop of promotions is maturing.

Of course the professional is less burdened by taxation, on paper, than the very rich; though surtax hits him at about the level where he might otherwise afford a cook, he does not qualify for an impost of $3.90 on $4.00. But the very rich are generally so by reason of their capital, and can maintain their standards by simply spending it. Moreover, many a business man can, while remaining well within the law, work miracles of good living on his expense account—encouraged thereto by the profits tax; and he can cultivate a debatable terrain between income and capital gains where the professional has no consolatory foothold.

Both as compared with the wage-earner and the profit-maker, the salariat have in fact lost ground out of all proportion to the general fall in national wealth. Depressing as this may be for those affected, the community might, of course, view their decline with the same equanimity as it did that of the cab-driver ousted by the taxi, the officer robbed of promotion by the outbreak of peace, or any other interest damaged by the progress of social and economic events.

AFTER all, the professional classes are not actually starving or barefoot. But it is not consuming power alone which has suffered; it is, above all, leisure; and it is precisely the characteristic of intellectual work, particularly in its higher grades, that to be properly done it must have a certain amount of leisure surrounding it. The senior administrator cannot judge policy with his nose incessantly at the grindstone. The academic cannot contribute worthily to the advancement of knowledge when swamped with routine teaching.

And outside actual working hours, when the professional man used to find time for the exchange of ideas, the cultivation of the humanities, voluntary social work, civic activities, and the attainment of that mental perspective in which alone the specializations of professional life can be seen in true proportion, there is now merely the solitary struggle with the day's overspill from office or consulting room, and a multitude of domestic odd jobs. This is not a favorable climate for creative advances in any field — administrative, academic, scientific or cultural. And however low the abstract deserts of the professional, creative progress is not lightly to be sacrificed.

If the Labor voter cannot see why a bishop should not shine his own shoes and stoke his own stove, and still less why a woman doctor should not scrub her own kitchen and fillet her own herrings, he should if possible be brought to understand that leisure, privacy, and the opportunity of external contacts is an essential to high intellectual activity as extra rations are to heavy manual labor.

That understanding is evidently remote. To the Left, the middle class is unmistakably — *pace* Mr. Morrison—a class enemy; the old slogan about workers by hand and brain does not comprehend the over-$2000-a-year man. For him, two hoots and a tinker's curse are ample. Indeed, from almost every relevant action that the government has taken there might be deduced a desire to hit the professional man harder than the plutocrat.

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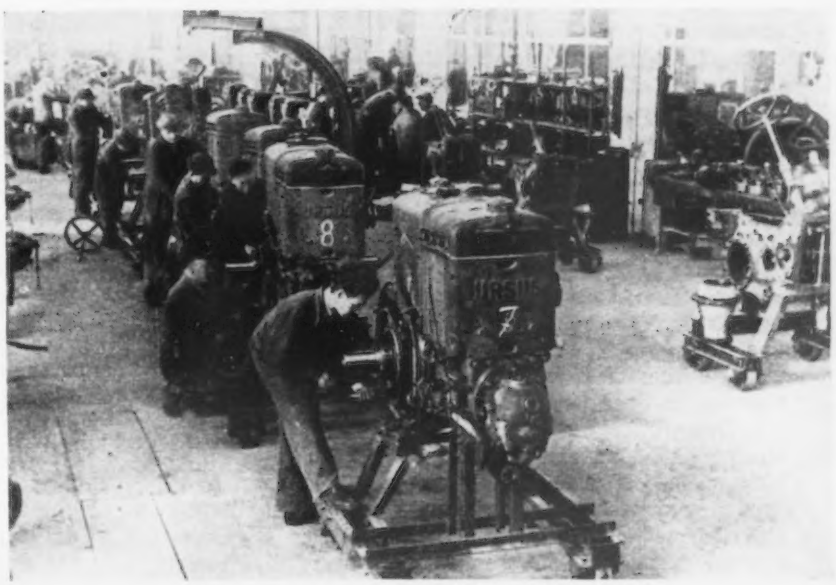

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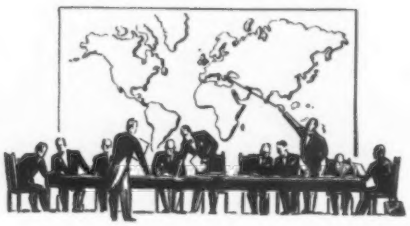

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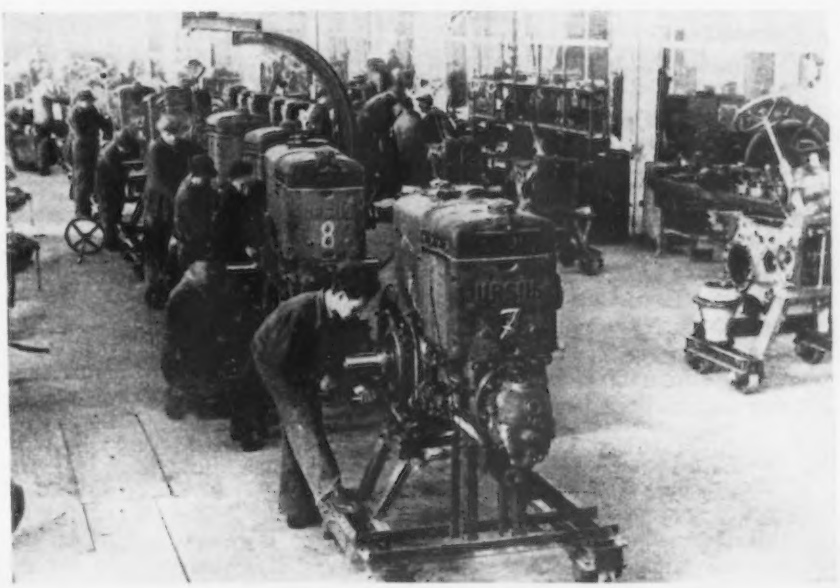
The winds of austerity are tempered for the wage-earner, and the capitalist has a fur coat of capital, but the professional class can, for all the government cares, just shiver.

POLISH TRACTORS: ***Assembly line production of tractors is now under way at a factory just outside Warsaw. The country reported that farm machinery output reached its goal under the fiveyear plan during 1947.***



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Industrial News Summary...

- ***High Scrap Price Trend Stymied***
- ***Steel Firms Hit Ingot Conversion***
- ***Raw Steel Output Drops to 94 Pct***

A MAJOR prop contributing to higher scrap prices, and, in some cases, gray market activity, has been quietly hacked to pieces in the past few weeks by some steel producers. Some steel firms which have converted ingots from outside sources and have been well paid for the processing have become extremely skittish towards such deals.

In some cases maidenly shyness has gone so far as to produce outright refusals to accept any more ingots for conversion. This does not mean strictly legitimate conversion operations, where a producer and his own customers benefit. But it may mean an abrupt change in the policy of some companies in indiscriminately engaging in the conversion of steel ingots.

Thus some steel firms have realistically wised-up to the fact that some of the higher scrap prices in recent months and some of the gray market activity has stemmed indirectly from conversion projects, regardless of attempted close scrutiny and control by the steel firms involved.

It is quite clear this week that even a police state would have difficulty wiping out steel gray markets as long as fabricators insist on keeping their operations at a high level and the supply of steel falls below total demand. Added pressure on steel deliveries has driven the gray market price of sheets further upward. A few months ago $200 a ton was a rough average for gray market sheets—$300 a ton is a good median now, which means that in many cases much higher than this has been paid.

IN St. Louis eager steel users are going beyond simple gray market buys and conversion plans to get their steel. One company has bought a special annealing furnace and has installed it in a steel mill to handle odds and ends rejected in normal production processes. Another firm has paid for the repair of an openhearth in a small castings plant and is buying scrap and fuel oil. The firm is paying all costs to keep the furnace in operation in order to get the steel ingots.

Other manufacturing companies are making plans to build new factories with primary steel fabricating operations to be performed near major steel producing plants. This step would allow the manufacturing firm to duck the freight absorption problem, which is ham-stringing consumers in St. Louis today, and would eliminate cross hauling on scrap generated by fabrication operations.

Despite extreme pressure for steel deliveries, steelmakers have made friends in some cases. Stopping of shipment on certain proprietary shapes, long used in manufacturing operations, has produced considerable bitterness in the St. Louis area. Carelessness on the part of some companies in overselling their output and then not being able to make good on delivery promises has provoked some sulfurous comments from suffering consumers. A policy of complete candidness by other steel mills has made fast friends—sometimes in spite of reduced deliveries.

IN the cat and dog fight over scrap prices, consumers have played their trump card in the past few weeks. When it was hinted that some scrap consumers would shut down openhearths before they would pay higher prices the cry of "bluffing" arose. Knowing it was now or never some steel firms have taken off openhearths rather than breathe new life into a scrap market which has begun to show the prospects of softening when present cold weather effects have worn off.

The threat of a long term scrap shortage is still in the picture. But the strong stand taken by scrap users has finally convinced some scrap dealers that higher prices are not probable in the near future. This does not mean that enough scrap can be obtained soon in order to push steel output up through the present ceiling which has been supported by a general shortage of raw materials. Steel ingot output this week is down 1 point to 94 pct. More than 150,000 tons of finished steel in the Pittsburgh district alone have been temporarily lost due to the gas and oil shortage during the cold weather.

ALL sheet produce price differentials among major producers have been eliminated within the past few weeks. One major producer which had lower prices on galvanized sheets, enameling sheets and long ternes is now quoting at the high level.

In some areas the supply of stainless steel, cold finished bars, electric welded tubing, wire rope and some types of alloy steel products, is better in relation to demand than was the case a few months ago. Some firms, according to customer reports, have become vulnerable on some extra charges. The practice of setting up basket sales—so much carbon steel for each stipulated tonnage of alloy steel or stainless—is continuing in the trade.

As expected, the allocation of steel for the 10,000 freight car a month program will be predicated on the amount of steel capacity participating firms have of total capacity. This means that some of the larger firms will ship less steel to freight car builders while other steel companies must commit themselves for a much larger percentage than they have so far. Right off the bat this brings to the surface the question of priorities over priorities.

Firms which must ship more steel under the voluntary allocation plan than they have been doing will plague the allocation board with the problem of what to do with other essential users who will be affected by the shipments. This situation will probably be mild compared to other problems which are to come.

• **KAISER GETS IRONTON**—As Kaiser-Frazer Corp. announced purchase of a blast furnace and coke oven in Ironton, Utah, from War Assets Administration for $1,150,000, reliable sources revealed that K-F is also interested in operating one of the Wickwire Spencer Steel Co. furnaces at Tonawanda, N. Y. Operation of the furnace would be handled through Portsmouth Steel Corp., in which K-F has a large stock interest. Wickwire Spencer Steel Co. has two blast furnaces in Tonawanda's—"X" furnace not in operation and "Y" furnace, jointly operated by Republic Steel Corp. and Wickwire Spencer. It is "Y" furnace in which K-F is thought to be interested. Acquisition of the Ironton, Utah facilities will enable K-F to increase production from the present rate of about 1000 to 1500 cars a day, according to announcement.

• **SCRAP LEGISLATION**—Legislation to pry loose stocks of potential scrap now held by the government is being studied by the Senate Banking Committee. Government-held ferrous surplus would be offered to the public for 60 days, under the bill. Stocks still unsold after 60 days would then be sold as scrap to highest bidders. Return of overseas scrap also is proposed on a highest-bidder basis. A limit of one year for collection and return of overseas scrap is set.

• **DECEMBER EMPLOYMENT**—While employment in basic iron and steel plants leveled off during December, slight increases showed in most metal fabricating industries to bring the total workers in iron and steel and their products to 1,885,000, according to BLS statistics. For the first time in its history, employment in the automobile industry passed the million mark with a total 1,008,000 workers on the job. Employment in nonferrous metals and their products remained stable at 466,000 for the last month of 1947. Machinery and equipment makers were employing 2,300,000 workers, also an increase.

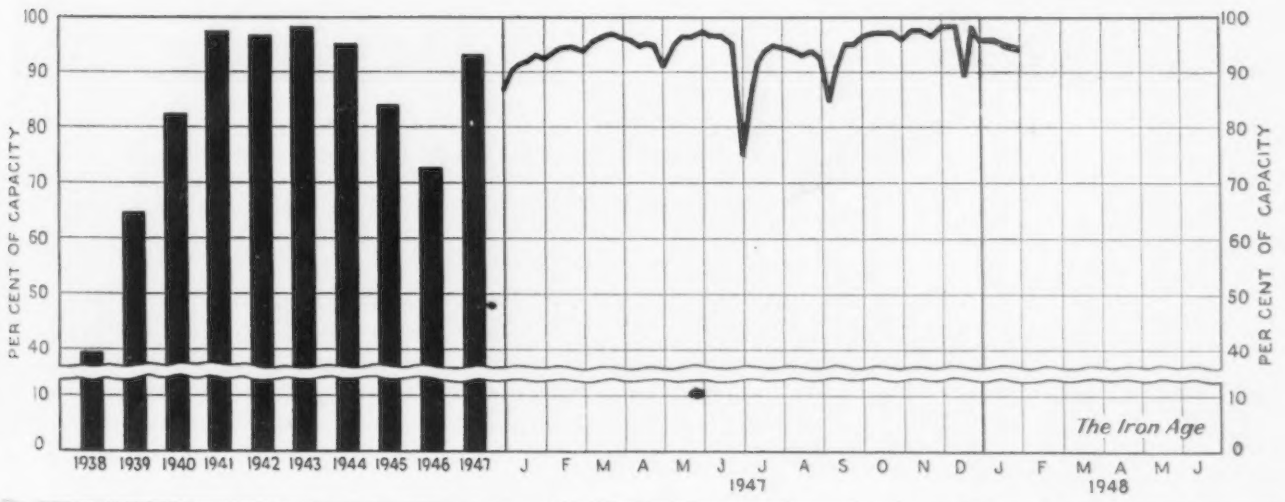
• **PRICE INCREASES**—A British Ministry of Supply order has authorized the following increases in ceiling iron and steel products: basic pig and hematite, $1.80 per ton; foundry pig, 80¢ per ton; blast furnaces ferromanganese, $1.20 per ton; billets, $1.00 per ton; heavy bars, sections, plates, $1.00 per ton; heavy rails, $1.00 per ton; bars, sections, strip (from rerollers), $1.20 per ton; tubes and wire, $1.50 per ton. Sheets below 3 mm are unchanged. The increased cost of coal is blamed for these price increases.

• **WAGE CAUCUS**—The United Steelworkers of America has announced that its 170-man Wage Policy Committee has been called to meet in Pittsburgh Feb. 18. The committee is expected to prepare a program to lay before the steel industry calling for an increase in wages. Contracts in the basic steel industry run to Apr. 30, 1949, but provision is made for reopening the wage section of the contracts by the submitting of formal notice on Apr. 1, 1948.

• **BETTER LATE THAN NEVER**—Allis Chalmers Mfg. Co., which until recently had not used conversion steel possibilities to increase their supplies, decided to move in that direction late last year. They found they were a little late, as the line formed at the right in the sales offices of the Chicago producers. After some difficulty and delay they have been successful. Late in January Republic Steel agreed to ship ingots to the Carnegie Illinois Steel Corp., who would roll slabs and then plates for the Milwaukee company.

• **PUBLIC AUCTION**—Sale by public auction in an effort to speed disposal of hard-to-move surplus war plants will be tried out in the near future by War Assets Administration. Selected for test sales are the $1.5 million National Supply Co. engine parts plant at Toledo, the $3.6 million Harrisburg Steel Corp. plant at Harrisburg, and the half-million dollar Symington-Gould Corp. steel foundry at Rochester.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
January 27	96.0*	92.5	92.5*	93.5	94.0*	93.0	99.5	103.0	100.0*	95.5	107.0	78.0	87.0	95.0
February 3	95.0	92.5	92.5	88.0	94.5	96.0	96.0	102.0	101.0	95.0	102.0	78.0	87.0	94.0

* Revised.

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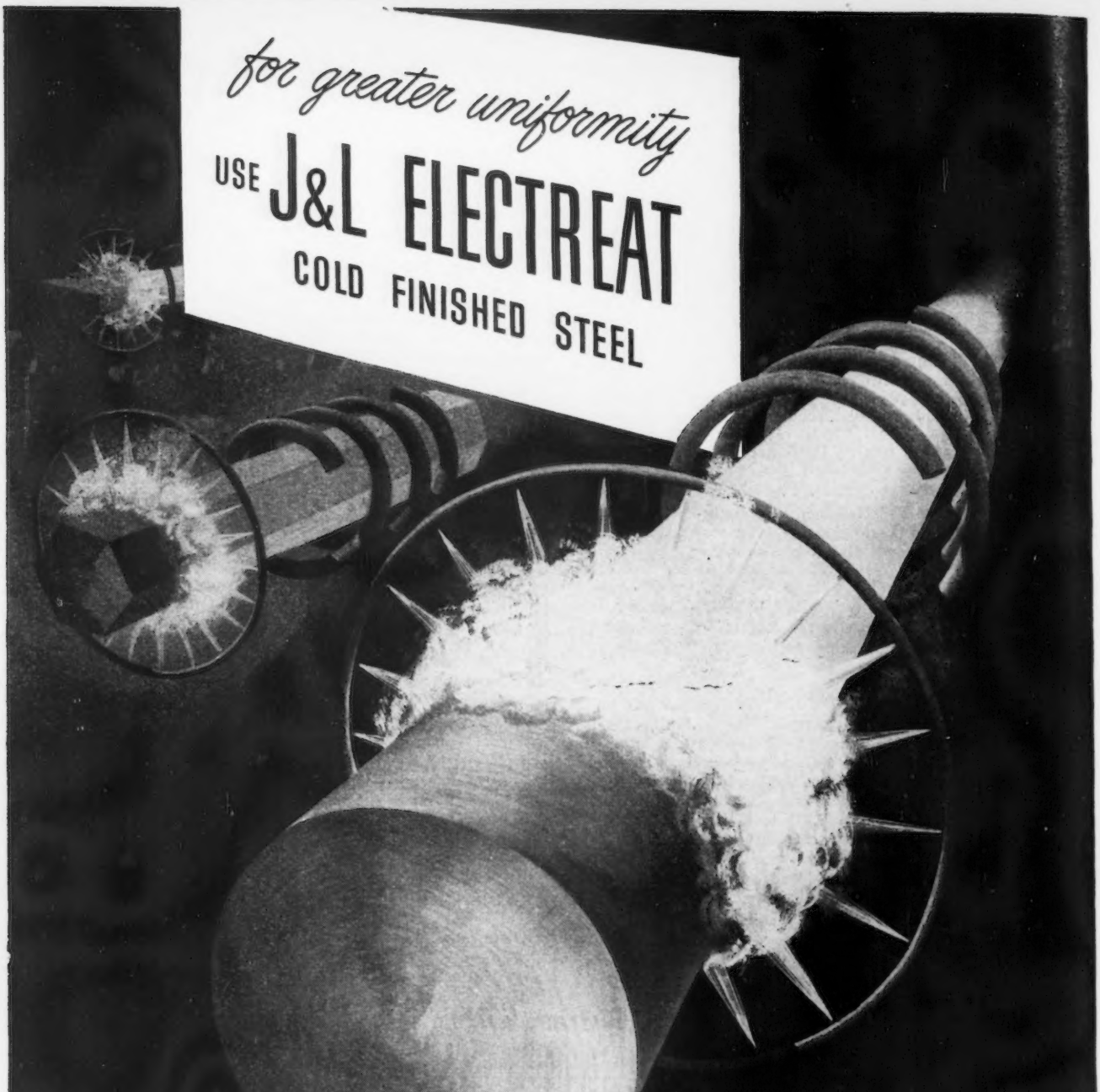

The new induction heating method of producing heat treated quenched and tempered cold finished steel makes possible an unusually accurate control of the process. Bars are fed individually through the coil and heated to exactly the desired temperature. They pass immediately through a cone of water sprays which is used to closely regulate the cooling. The Electreat cold finished bars produced by J&L with this process have a degree of uniformity not possible with conventional methods. Write for complete information.

J&L STEEL

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At First Blush Steel Net Earnings Look Fine, But—

Equipment Costs Are Higher And Still Increasing; Test Comes Later

o o o

By TOM CAMPBELL
News-Markets Editor

o o o

New York

• • • **Steel leaders** this week and last had a slight twinge of conscience when releasing their annual reports. They need not have. At first blush the earnings looked pretty good. On second look they weren't so hot.

Compared with earnings in 1946, net profit in 1947 was way up. But it should have been for the following reasons:

(1) There was a steel strike in 1946. About 16 million tons of steel was lost. There was no strike in 1947. Output was 85 million tons compared with 66.6 million tons in 1946.

(2) Prices were raised in January 1947 and in August 1947. Wages were advanced too but price increases were stiff.

(3) Extra charges were revised two times last year. This added to net income.

(4) Steel firms withdrew from distant points where they had to absorb freight. This meant selling in their backyard with less freight absorption.

(5) Some steel companies made a greater percentage of products which made the most money and cut down on non-profitable items.

(6) Other steel firms have done fairly well on legitimate conversion deals where they have been paid for processing someone else's ingots and for making sheets and strip from semifinished steel furnished by others.

With all of the above it is questionable as to why steel companies did not make more than they did. Some reasons why they didn't are:

(1) Steel labor costs are up over 1946. But not as much as some steel leaders say they are —on a percentage basis.

(2) All expenses for making steel are up including repairs and maintenance.

(3) Equipment prices are higher and the cost of replacing steel mill equipment is increasing. Some sources say that it now costs $300 a ton to replace a steel mill from ore to finishing end.

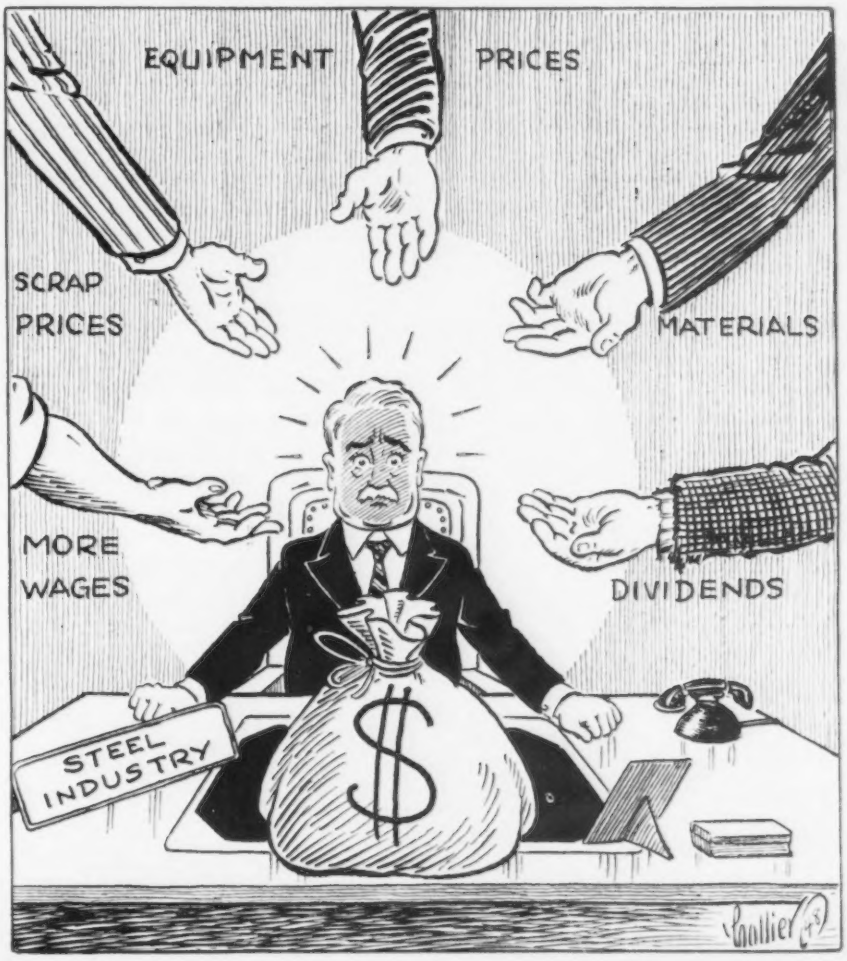
(4) The higher steel output goes, the more high cost equipment must be brought in. This is the case now. Any more steel being made will come from such equipment.

Steel leaders are not pleased with steel earnings last year. First quarter earnings this year will be higher due to some price increases. But even that will not take away the serious thought—what will happen when supply catches up with demand?

It did not take too much brain power to put into operation the factors which were mentioned as contributing to higher 1947 profits. Most of it was negative and not what management would have done if they could have accomplished it some other way.

When harder times come it will be tough on steel mills. It may be some time before the test comes. But the certainty of it trails steelmen like their shadow on a sunny day. The net income of major

Gimme! Gimme!! Gimme!!!



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companies shown elsewhere in table form speaks for itself.

First quarter earnings of some steel companies should be better than the fourth quarter of last year. Firms which make tinplate items will gain from the increase in tin mill product prices made effective on Jan. 1.

Steel companies making wire and nails will also show a greater return than in the final 1947 quarter and the same will be true for makers of some railroad specialties like tie plates, axles and wheels.

As far as firms making alloy steels, net return this year should be affected positively by the extra changes which were made a month ago in alloy steel extra charges.

Harriman Says Steel Allocation Program Small Pct of Total

Washington

• • • **The Steel Producers'** Industry Advisory Committee received assurances from Commerce Secretary Harriman last week that the voluntary allocations program, as presently planned, would take a "relatively small proportion of total steel output."

However, the Jan. 30 meeting did not develop any concrete program for the allocation of additional steel, despite the fact that, according to one Commerce official, "the steel industry came into the meeting looking for a program." Positive results include a general agreement on procedures, the establishment of subcommittees to study specific problems and the appointment of Melvin W. Cole, Bethlehem Steel Co., as head of the steel section of the Office of Industry Cooperation. Mr. Cole served as head of WPB's plate and structural section during the war years.

Commerce had hoped to bring the ODT-sponsored freight car program under the wing of OIC by Feb. 1 and that this would be wrapped up at last week's meeting, but an inter-agency conflict has developed and the outcome is still uncertain.

Other developments include a definite feeling of skepticism on the part of several dozen farm equipment producers who met with Commerce last week. However, the group agreed to set up a formal industry committee to advise on problems affecting their industry. A petroleum industry committee is also functioning under the Dept. of Interior and is working up a schedule of steel requirements. John C. Virden, director of OIC, discussed this problem with Interior Secretary Krug early last week. A labor advisory committee is also being established by Commerce.

As to the amount of steel which might go into the voluntary program this year, Commerce officials say that they are not yet in a position to make an accurate forecast. The 10 pct figure attributed to Secretary Harriman at his press conference has been widely misinterpreted. In response to repeated questions, Mr. Harriman actually stated that he "would be surprised if it ran as high as 10 pct of total output."

With only four commodities now on the list to receive additional steel, the requirements will probably be considerably less than 10 pct, according to officials charting the program. In fact, it is hoped that increased production this year will be able to carry the programs without any major disruption affecting other consumers.

The four areas in which the program is expected to operate are freight cars, farm equipment, petroleum equipment and building materials for small home construction. Mr. Harriman pointed out that freight car producers will

(CONTINUED ON PAGE 124)

Summary of Steel Company Earnings

COMPANY	YEARLY EARNINGS		
	1947	1946	1929
UNITED STATES STEEL CORP.	$126,704,272	$88,622,475	$197,592,060
BETHLEHEM STEEL CORP.	51,088,375	41,731,931	42,242,980
REPUBLIC STEEL CORP.	31,018,409	16,033,468	20,526,813
JONES & LAUGHLIN STEEL CORP.	22,383,591	10,854,084	20,848,748
YOUNGSTOWN SHEET TUBE CO.	26,299,923	14,254,905	23,774,174
NATIONAL STEEL CORP.	26,838,788	20,461,651	11,776,097
INLAND STEEL CO.	29,888,558	15,556,897	11,712,374
WHEELING STEEL CORP.	10,445,161	5,372,910	8,005,664
ALAN WOOD STEEL CO.	1,153,480	793,941	.....
ALLEGHENY LUDLUM STEEL CORP.	6,002,657	6,599,346	4,231,023*
LUKENS STEEL CO.	2,835,702	651	670,310

* Allegheny and Ludlum combined.

U. S. Steel Corp.

ITEMS	Fourth Quarter 1947	Third Quarter 1947	Fourth Quarter 1946	Year 1947	Year 1946
Net income	$29,397,811	$28,735,082	$31,215,636	$126,704,272	$88,622,475
Dollars per share	$2.65	$2.58	$2.86	$11.66	$7.29
Sales in $ millions	$595	$518	$472	$2123	$1498
Shipments—net tons	5,359,763	4,808,277	4,902,742	20,300,430	15,181,719
Pct ingot operations	100.7	90.2	87.4	96.7	72.9
Average employees	287,401	287,217	276,237	288,316	266,835
Total payroll	$244,910,048	$221,672,393	$195,746,115	$890,113,376	$694,258,238
Average pay per employee	$852	$772	$709	$3109	$2602
Pct payroll to sales	41.2	42.8	41.8	41.9	46.4
Net income per ton of shipments	$5.48	$5.98	$6.37	$6.24	$5.84

Bethlehem Steel Corp.

ITEMS	Fourth Quarter 1947	Third Quarter 1947	Fourth Quarter 1946	Year 1947	Year 1946
Net income	$12,377,647	$10,211,336	$11,937,281	$51,088,375	$41,731,931
Dollars per share	$1.21	$0.96	$1.15	$4.98	$3.93
Sales in $ millions	$288	$241	$226	$1032	$788
Shipments—net tons	2,493,775	2,383,000	2,136,991	9,403,069	7,284,952
Pct ingot operations	103.8	96.0	85.1	99.3	77.6
Average employees	138,000	143,681	140,655	.....	143,742
Total payroll in millions	$109	$93	$97	$413	$383
Earnings per hr	$1.70	$1.65	$1.51	$1.62	$1.495
Pct payroll to sales	37.8	36.6	43.1	40.0	48.6
Net income per ton of shipments	$4.96	$4.29	$4.29	$5.43	$5.73

King Winter Defers Production of 100,000 Tons Finished Steel

Cold Causes Many Shutdowns When Supply of Natural Gas Is Curtailed

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By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

o o o

Pittsburgh

• • • **Almost 100,000 tons** of finished steel production was "deferred" in this area due to cold weather last month. Ingot production did not suffer much. The cold weather began reducing natural gas supply to mills in mid-January and during the final week of the month industrial consumers were cut off completely though some small amounts were permitted for maintenance.

The end of the cold snap will not mean immediate return of these facilities—another week will be required to permit full operation, informed sources agree. This would mean further deferment of perhaps another 40,000 or 50,000 tons of finished steel. Continued cold would mean far more serious losses, eventually cutting into basic steelmaking.

Ice on the district's rivers cut coal movement to a trickle and stockpiles had to be used to feed coke ovens. Standby oil facilities have been called into play in steel mills and fabricating plants to ease the blow but they are generally unable to carry the full load anywhere. Shipment of scrap by barge had practically ceased beginning with the week of Jan. 26. Rail shipments of coal and ore were also delayed and blast furnace operations were slightly reduced due to difficulties with frozen ore.

The length of the cold wave, plus another week to rebuild gas supplies, is the determining factor on ingot operations. Last week mills were maintaining openhearth operations only slightly below the previous week's rate. Roughing mills were converting the ingots to blooms, billets and slabs. No sheet and strip lines were off at that time but other finishing lines were taken off.

Carnegie-Illinois, which has been losing finished steel production for the past 3 weeks, had 12 mills down at various plants at the end of the month. These included plate, bar, and structural mills and the wheel and axle plant at McKees Rocks, Pa. Two gas-fired openhearths were off at the Vandergrift works, meaning a loss in electrical sheet production. Carnegie-Illinois, in addition to buying gas from U. S. Steel lines, also purchases from most of the utilities in the area.

As semifinished steel began to pile up, Carnegie-Illinois took off 12 openhearths at Homestead and 4 at Clairton. This means a total of 18 openhearths down in the corporation's plants in the district at the beginning of the week. Ingot loss for the week at this rate would be about 15,000 tons. Gas saved by shutting down the openhearths was used to put 8 of the shutdown finishing mills back into operation, leaving only 4 off on Monday of this week.

At the end of the month U. S. Steel had been forced by river ice to close five mines, including Robena, for a 150,000-ton coal loss during the week. Late last week Jones & Laughlin had to close its great Vesta No. 4 and No. 5 mines for a loss of 15,000 tons of coal a day. Coal was held up at the tipples because boats could push only two barges through the ice instead of six. Some J & L coal was moving in by rail. The company reported that as of last week there would be no delay in finished steel shipments from its plants here.

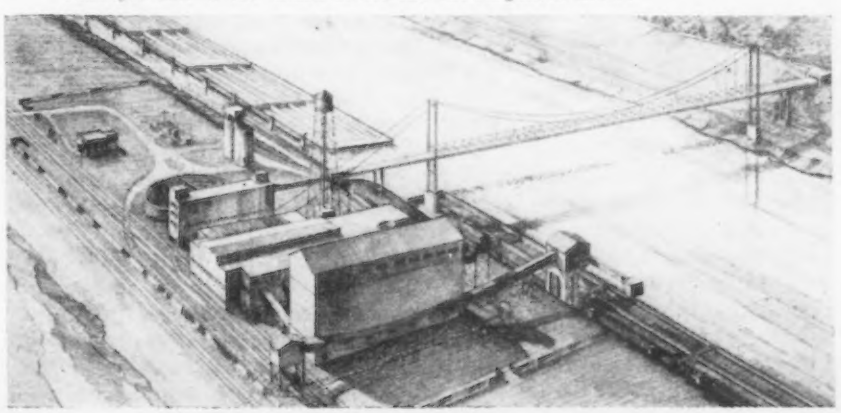
Allegheny Ludlum Steel Corp., despite an elaborate reserve fuel system, had to cut off rod and plate mills and lay off 4000 men last week. The company has a reserve propane storage unit plus standby oil equipment and a gas well but the shortage still cut its fuel supply by about 35 pct. To save gas the shop puts scrap in charging boxes on rails laid across slag thimbles. This dries it without the usual gas flame.

Weirton Steel Co., reports little beyond the usual cold weather difficulties. It relies upon producer gas at its Weirton works. Its Steubenville works is being connected with Weirton by an underriver pipeline to reduce its dependence on natural gas supply.

Wheeling Steel Corp. shut down both bessemer converters at the Benwood, W. Va., plant and had been forced to cut down on fabricating at Steubenville.

Jessop Steel Co. and Washington Steel Corp., both at Washington, Pa., have been hard hit by stoppages of heating and annealing furnaces. Crucible Steel Co. of America reports that a shift to standby oil equipment had prevented any serious delays. Follansbee Steel Corp.'s Follansbee, W. Va., plant was said to be almost completely down, though it was able to keep its four openhearths and bar mill running at Toronto, Ohio.

COKING COAL: *A new coal cleaning process is being installed by F. H. McGraw & Co. as part of the expansion program of the Jones & Laughlin Steel Corp. mines in Washington County, Pa. The drawing shows the preparation plant in the foreground and a 726-ft suspension bridge to support a conveyor belt to the mines across the Monongahela River.*



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Gray Market and Conversion Deals Thrive in St. Louis Area

Withdrawal of Steel Firms Puts Oldtime Customers Out in the Cold

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By JACK R. HIGHT
Ass't. News-Markets Editor

o o o

St. Louis

• • • **Steel consumers** in this area, having been jostled, shaken, and disordered by steel mills since the war, are now being starved. The successive action of several steel companies in pulling out of this market has left one after another of the purchasing agents in the city in the lurch. This week the operation of a new cold rolling mill in the Granite City steel mill across the river is cutting off the city's most important source of hot-rolled sheet, and sending the purchasing agents back to the wailing wall.

Sheet users are the worst hit. But there is an immediate problem in plates that is becoming almost as impossible. That is not to say that there are any steel items that are easy to get here.

Most of the explanation of the tough situation here can be made historically. Before the war, Bethlehem, Republic, and Youngstown Sheet & Tube Co. shipped a lot of steel in here. In almost every case, they sold it on a Granite City basing point. They absorbed a lot of freight charges to make such shipments. When steel mills began cutting off customers located far from their mills, the St. Louis area was a natural. Chop, chop, chop, and it was done.

Republic Steel Corp. has almost completely pulled out of the district. Bethlehem is shipping some small tonnages of certain products, but has stopped shipments of the large tonnages it formerly shipped from the East. Youngstown Sheet & Tube Co. has effectively pulled out of the district on many products, as has American Rolling Mill Co. Several smaller steel companies have also stopped shipping into the district, or have cut off a number of customers in this area.

To the steel mills, these cuts simply mean good business sense. Why cut steelmaking profits by absorbing freight when they can sell all the steel they want in their own back yard? Many of the companies that are still shipping certain products into St. Louis are avoiding this problem by quietly billing their customers here as of the first of this year on more distant basing points than Granite City. The steel supply situation is so embarrassing that no purchasing agent is in any position to quibble on this point.

What is good business sense to steel producers has singled out St. Louis as one of the hardest hit consuming centers in the country. Purchasing agents have, in effect, gone on the road to try to buy steel. One company here sends its purchasing agent, works manager, and vice-president of operations to Pittsburgh 1 week of each month to canvas the steel mills. After the rounds have been made, a meeting in a hotel room, summarizing results, or the lack of them, outlines the company's production program for the following weeks.

The general raw materials supply situation here has advanced since the end of the war to the point where purchasing agents report that they can get any other material they need in a reasonable period of time—except steel. In every factory where steel is used in fabrication, steel is today absolutely controlling the level of production. There are no exceptions on this point that this writer has been able to find.

Despite the fact that everyone here who buys for an industrial plant is constantly trying to figure a new angle on steel, there is almost universal agreement that by and large steel salesmen are honestly doing their best under today's circumstances. Every purchasing agent, with some candor and some anxiety to protect existing mill quotas—however small—prefaces his remarks with a thorough endorsement of the good intent of the steel mills in a trying situation.

Sorting through this avalanche of quasi-synthetic goodwill one finally gets down to the gripes. There are many. Some mills, whether they have tremendous tonnages to ship into this area or not, are doing a better job of selling their organizations to customers than are others.

In particular, every consumer contacted in the area starts off by citing the good job being done by Carnegie-Illinois. The U. S. Steel Corp. subsidiary is shipping steel to many consumers in the area, but it has also managed to convince them that it is doing everything in its power to get them more wherever possible.

Another company doing a good job here is Inland. It, too, managed to build up a big tonnage of good will, along with the steel it has been able to ship here. Naturally, Granite City Steel Corp., located just across the river, has many good customer relationships in the district as well. After these companies have been mentioned, the local opinions become more mixed, with resentment running high in some quarters against the mills which have pulled out of the area on some or all of their steel mill products.

The smaller consumers are undoubtedly hardest hit. Many of

On the Spot

• • • This story is the result of a number of on-the-spot interviews. More than the surface was skimmed. Information was checked with material from other sources. St. Louis steel users are paying through the nose to keep up their production schedules. No attempt is made here to place any blame. Steel firms know why they pulled out of St. Louis and steel users there know they are suckers for gray market steel and conversion setups.—Editor.

them leaned heavily on two or three steel firms for their supplies in prewar days, often buying all their needs for a single group of products from one company. If the sole supplier happened to be one that has pulled out of the district, the customer is really in tough shape. If, on the other hand, his two principal suppliers in prewar days happened to be Carnegie and Inland, he is in comparatively good shape.

There is little evidence that steel users are sitting with folded arms while operations in their plants are curtailed for lack of steel. Depending on a number of factors, most companies that must have steel for their operations are going out into the open market and supplementing their mill quotas with steel at 7¢ to 15¢ per lb. One company reports that it was able to buy ingots and arrange for rolling into plates for 7¢ per lb.

This price is considered to be low in this area for conversion deals. They mostly work out at about 10¢ per lb. Generally the larger consumers are getting their steel by purchasing their own ingots or billets and working from there. Smaller consumers seem to favor going to brokers to buy sheet or whatever is needed. There is a feeling here that most of the high priced steel being sold locally is coming in from the Southwest and the far West.

A lot of the cause for the woeful steel tales to be heard in St. Louis is that there is a big expansion in industrial activity here in comparison with prewar. As a gateway to Western and Southwestern markets, many companies which have factories here are expanding their business. Companies long established here are frequently attempting to integrate their operations, with increased steel requirements as a result. Many users are in the position, for the first time in many years, to substantially expand their scale of operations. Steel shortages place an absolute top on such action. To such a company, a historical allocation of steel on prewar lines is a very unsatisfactory piece of business.

In addition to the general lack of mill quotas, poor performance on 1947 quotas also gummed up production schedules here. Several mills cut out fourth quarter quotas entirely, did not ship them until last month—with a warning that it would probably count as the first quarter quota. One mill is already whining off on quotas just set up for this year. December deliveries in most cases have dragged into January, and many consumers had not seen a pound of their January quota up to last week.

The handling of quotas and quota promises by certain mills has also made some enemies for steel companies. In the place of clear cut answers to applications for steel, some mills have kept marginal customers dangling for months before finally chopping their heads off. Sudden death might have been less painful.

There is a lot of reciprocal dealing that is helpful to some of the purchasing agents. Those that are fortunate enough to be selling something direct to steel mills are especially lucky in this respect.

WAA Denies Possession of Vast Quantities of Scrap Iron, Steel

Only 100,000 Tons Declared Available During First Half of This Year

Washington

••• Potential iron and steel scrap now held in War Assets inventories in the form of obsolete, special purpose and other types of unusable machine tools amounts to no more than 25,000 tons, agency officials told THE IRON AGE this week.

Furthermore, Deputy Administrator E. H. Stewart declares, were all other unsalable industrial equipment added to the machine tool scrap, the total still would not exceed 100,000 tons.

Charges have been made, in Congress and out, that WAA has vast quantities of potential scrap in its inventories, some estimates running as high as 5 million tons. These were branded as fantastic guesses by the agency.

"I have informed Presidential Adviser John Steelman that 100,000 tons of scrap is all that may be expected from WAA during the

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first half of 1948," Stewart said. "This includes unusable machine tools, industrial equipment, and metal odds and ends from our warehouses."

These estimates do not include aircraft and components or other types of surplus.

Mr. Stewart added that at no time has WAA ever had more than 300,000 tons of machine tools, including usable equipment, in its inventory. Such a peak was reached about a year ago.

While a firm inventory has not been, and still is not, possible at any given date, WAA says that for the first time it has something substantial upon which to base estimates of scrap potential from machine tools. This is the operation of the Detroit regional office, now in the process of liquidating its machine tool stocks.

In May 1947, Stewart said, there were 30,000 machine tools in inventories under control of the Detroit office. This, he said, represented about 20 pct of total stocks then on hand.

Some 12,000 tools were claimed by JANMAT under its national security program and these were set aside for standby storage; the remainder were offered through regular channels and another 15,000 were disposed of to priority holders and commercial buyers and to institutions for training purposes. Of the 3000 remaining in the Detroit inventories, no more than 1500 represent potential scrap. This would amount to about 3000 tons.

"It is reasonable to assume that

UNIVERSITY OF MICHIGAN LIBRARIES

the experience of the Detroit office is generally representative of the other regional offices," officials said.

JANMAT has been but one of the factors which tend to delay the disposal of machine tools and industrial equipment. Nevertheless, it is a major one.

Under an agreement between WAA and JANMAT, when the disposal agency completes a warehouse or other inventory, the list is sent to JANMAT which is allowed 30 days to screen and select items for standby purposes. A "reasonable" period is allowed in which JANMAT may get a team on the job to inspect and tag equipment thus selected (this averages 30 days).

An additional 45 days are allowed for the services to obtain storage and issue shipping instructions—thus tying up disposal for a 3-month period.

The Defense Dept. has so far selected about 75,000 of the 92,000 items authorized; tagging is proceeding at the rate of about 1000 per week. About 30,000 pieces have been shipped to designated points by WAA.

•

• • • **Maritime Commission's** refusal to break loose 175,000 tons of ship scrap on the grounds that all bids were too low brought forth a rebuke of "unjustifiable action" from the industry.

The commission, meanwhile, is going ahead with plans to readvertise for bids—an action termed "ruinous to West Coast shipbreakers" by R. W. Wolcott, chairman of the Steel, Foundries and Scrap Industries' Committee for Expediting Iron and Steel Scrap.

Mr. Wolcott said the commission's action "did not seem to be in harmony with the President's recent instructions to Government agencies to expedite the recovery of scrap."

The 175,000 tons of potential scrap is contained in some 160 LSTs, Mr. Wolcott said. He added: "A substantial tonnage of scrap is withheld from the market when it is most critically needed, shipbreakers are being forced out of business, and essential West Coast steel and foundry production is being lost—all of which is contrary to our understanding of Government policy to expedite maximum scrap return to industry.

Public Funds Account For Quarter of Total Construction Last Year

Washington

• • • **Public funds** financed approximately one-quarter of the total construction put in place last year according to estimates by the Federal Works Agency. Preliminary FWA figures indicate $3 billion in public construction out of the estimated 1947 total of $12.9 billion.

This was an overall increase in public construction of 39 pct as contrasted with a gain of 28 pct in privately financed building over 1946. More than two-thirds of the public construction expenditures was by state and local governments.

Public construction showed increases in all fields but particular upturns were noted in building of highway and sanitation facilities. While letting of highway contracts began a decline in November, sewer and water contracts registered an increase.

Preliminary figures for December showed construction activity approaching the $1.5 billion mark with privately financed building accounting for nearly $1 billion. While these figures are a decline of 5.5 pct over November, it represents a 35 pct increase over the same month in 1946.

Bolt Co. Head Scoffs At Truman Expansion Plea

Pittsburgh

• • • **Theodore F. Smith,** Oliver Iron & Steel Corp. president, scoffed at President Truman's plea for a $50 billion industrial expansion over the "next few years." His company, he countered, professes a conservative expansion program. It has spent $2.5 million on it in the past 10 years, he asserted.

"It is unfortunate," Mr. Smith said, "that industry is today in the poorest position in American history to carry out the vast expansion program requested by the President. Facing a product demand so huge that it can only be charged with a direct responsibility in creating inflation, a strangulating tax policy drains off venture capital at a rate which nearly precludes new facilities programs. It now requires about $9000 investment in plant equipment and training per man to produce one industrial job compared with $6000 just prior to the war."

Consequently, Mr. Smith concluded, the President's program confronts many inherent difficulties. The present "conservative" program that has produced a 10-year gradual expansion may yet be the salvation of American industrial progress. Oliver, he said, following that line, will put another $300,000 into expansion in 1948.

Detroit Steel Sells Cleveland Warehouse To Reliance Electric

Cleveland

• • • **A joint announcement** has been made by the Detroit Steel Corp., Detroit, and Reliance Electric & Engineering Co., Cleveland, of the sale to the latter of the land and buildings at 1170 Ivanhoe Road, Cleveland, occupied for the past 10 years by the Detroit Steel Corp.'s Cleveland branch as a steel warehouse and distributing plant.

The property was originally owned by the Connelly Boiler Works and at one time was also occupied by the Foster-Wheeler Corp. of New York.

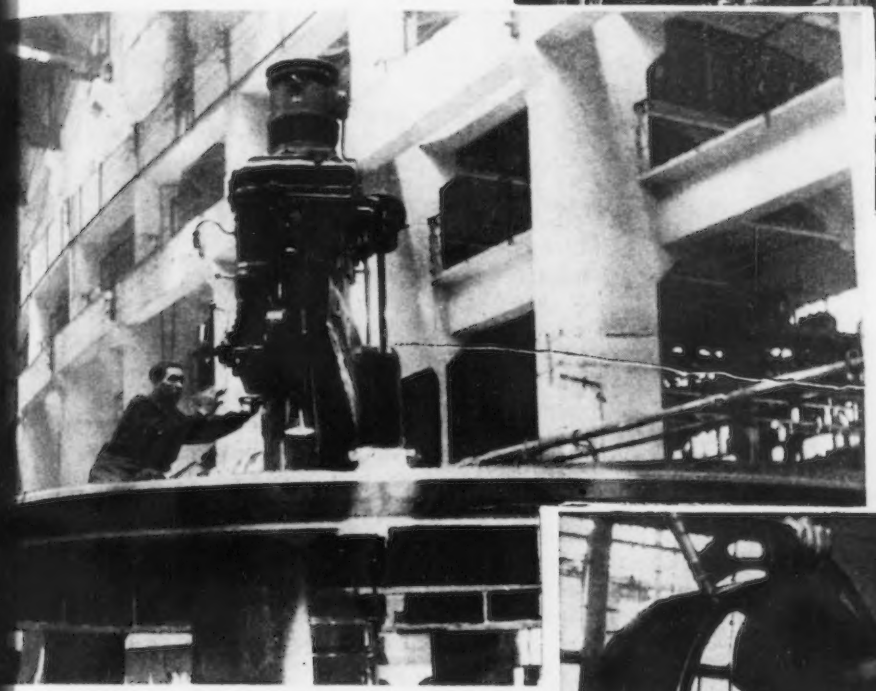
Detroit Steel Corp. announced also that plans are underway for a new plant for its Cleveland branch. The new plant will be designed and constructed to better meet the company's needs for steel warehousing and distributing operations. Disposal of the present plant is in accordance with such plans.

So that Detroit Steel may continue to serve its customers with the least amount of interruption until its new plant is ready, arrangements have been made with Reliance Electric & Engineering Co. to share occupancy of the premises during the transfer period, which may embrace seveal months.

Both seller and purchaser emphasize the fact that the announced transaction involves only the land and buildings at 1170 Ivanhoe Road. The existing processing equipment, supplemented by new facilities, will be moved to Detroit Steel Corp.'s new Cleveland plant.

NEWS OF IND

Machine Tool and Machining Practice Modernization Pushed by Russia to Speed Metalworking Plant Output



(ABOVE)

Built under the first "five-year plan," this is the largest machine tool plant in Moscow. A turret lathe is shown under construction in the foreground.

(BELOW)

Another plant built during the first five-year plan was a bearing plant near Moscow. These bearings are for the Zaporozhstal Works, a steel mill.

(ABOVE)

Machining of this stator for a hydro-electric turbine took place at the Stalin Metal Works at Leningrad.

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(BELOW, RIGHT)

E. O. Paton, vice-president of the Ukranian Academy of Sciences and hero of the Socialist labor, demonstrates "an original" welding machine he is reported to have developed. It is very like the submerged arc welding equipment on American markets for some years.

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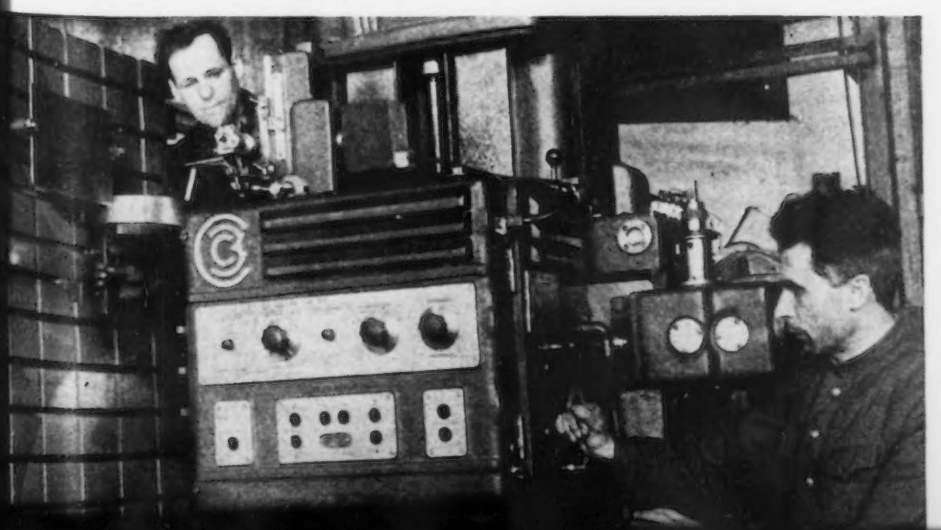
(BELOW)

At the Sverdlov machine tool plant at Leningrad, this electrically controlled, profile miller was developed.



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EDITOR'S NOTE: **A steel executive friend of ours is weary and numbed from his innumerable appearances before Congressional committees investigating gray markets. "Why don't you take a couple of weeks off and rest up?" we asked him. "How can I?" he shrugged. These Congressmen have got hold of a sure thing, and they know it."**

Next day we came across our friend again, looking more care-worn than ever. "I had the damndest dream last night," he confided, twitching noticeably. "You probably won't believe it, so I've written it all down," he added, looking around furtively. "Let's see what you've got," we said. With final quick, darting glances to the left and the right, he slipped us the following from his brief-case:

THE GRAY MARKET JUMP Or,

It Ain't What You Do, It's the Way That You Do It

The scene is a Congressional hearing room. Members of the Senate Gray Market Investigating Committee are momentarily expected to enter and take their places at an elevated bench. A small table and a chair are provided for the witness. The usual water pitchers, microphones and confusion of papers are all in place. One row of chairs (right) is occupied by a group of steel producers; another (left) by steel brokers.

A low hum of conversation dies down quickly as Senator Gimbel, the committee chairman, enters (front and center), followed by a dozen AFL musicians, with adequate stand-bys, who seat themselves just below the bench, select some sheets of music, and play a brief fanfare.

Then, amazingly enough, the band swings without pause into what sounds suspiciously like "The Varsity Drag" as other members of the committee step in briskly and group themselves for harmony:

Down on the heel
(*That steel broker guy!*)
Elections are coming,
Time's slipping by—
Everybody do the Gray Market Jump!
We've got the proof,
Everything's set!
Witnesses ready,
(*To producer's regret!*)
Everybody do the Gray Market Jump!
You can't lose,
Join in the fun—
Business can't vote, you know.
Let in the press,
Issue that writ—
We'll stage a first-class show!
Up on the bench,
Look out, below!
Business, be wary;
Brokers, go slow!
Everybody do the Gray Market Jump!

The committee members take their seats.

SENATOR GIMBEL: *(after the barest smattering of applause)* First, I want to thank all of you gentlemen for responding so graciously to my invitation to appear here.

AN UNIDENTIFIED PRODUCER: Get him! That jerk issues subpoenas like George Bender of Ohio sends Christmas cards. Invitations! Hah!

SENATOR GIMBEL: (pretending he didn't hear) Now, as you gentlemen know, this committee is deeply disturbed over reports that nearly 1/20 of 1 pct of this great nation's steel output is finding its way into gray markets. Gentlemen, gray markets have no place in the American way of life!

The committee members nod gravely, in unison. SENATOR GIMBEL: Now, do you producers have any comment?

They do, to the tune of "You And the Night And the Music":

Nobody's here but us chickens,
Your statement, sir, does us a wrong.
Our earnings, less tax, don't amount, sir,
To a song.
We're hurt, sir, that you are suggesting
Our sales pol-i-cies are awry,
That income from cold sheets and hot strip's
Too high.
For our virtue, you see, Mr. Chairman,
Is due to our honest desire
To combat inflation — of course not
Our fear of old customer ire.
So now you can see we a blameless,
As white as the new-driv snow,
Pray, give us surcease fro the spotlight
And we'll tell how
Little we know.

SENATOR GIMBEL: Take t stand, please, General Smithfie Van Brooks, III. General, as producer, have you sold any ste in the gray market?

GENERAL SMITHFIELD-VA BROOKS, III: Gray market, sir Hummmmmmmm. I seem to re member fantastic reports in th press concerning a gray marke But not in our company, sir. N sirree, sir, not in our company.

SENATOR GIMBEL: But ou committee investigator says h heard of some steel with your com pany's mark on it selling for $5 a ton on the West Coast.

GENERAL SMITHFIELD-VA BROOKS, III: (*angrily*) That probably that old spoilsport, Plenti ful Producer, telling tales out o school again. Drat the man! (*red faced and shouting, now*) Why, h has the goddamdest ideas abou public relations. He even hold press conferences and issues state ments!

The producers sadly nod assen in a hurt and resigned fashion Several bolder ones murmur, "tch tch."

At this point, a man who look suspiciously like Plentiful Produce —who was not invited to the hear ing—slips in through an unlocke window. He lets go with a lou "Psssssst" in the direction of th press table. Holds up several larg cartons of Tootsie Rolls and m

tions with his head toward the door leading to the corridor. Instantly, all the reporters stuff their notes in their pockets and follow him out the door for Tootsie Rolls and a press conference.

SENATOR GIMBEL: The next witness is "Gummy" Stainless, the well-known steel broker.

As Stainless walks toward the witness stand he turns around, smiles broadly at several producers and greets them loudly, "Hi, Bob. Hellow, Jim. Get that furnace fixed up yet, Ted?"

The producers stare at Stainless coldly and without a flicker of recognition. Then they all gaze out the window.

SENATOR GIMBEL: Mr. Stainless, we do not seem to have your address in our records. We checked your office telephone number and found it to be assigned to a pay station in a United Cigar Store. Is that where you transact your business, a cigar store?

STAINLESS: Well, I did, until the phone company took down the sign in my booth that said, "Don't Dial Until You Hear The Dial Tone." I kept my price list on that sign. I operate from Liggett's now. They have bigger booths, anyway.

SENATOR GIMBEL: Ah, competition! The life-blood of our economy! Has your business fallen off lately?

STAINLESS: (*woefully*) Has it fallen off? Listen, you schmoes . . .

The committee listens, even though the melody sounds like it was lifted from "The Loveliest Girl in Town."

I asked Purnell
And I asked Hank Roemer,
I even spoke
To A. B. Homer—
To see if they'd agree
To slip a few sheets to me.
For days and days
While the FBI tailed me,
I tried to buy, but
My sources failed me;
The Corporation's
Net of spies
Had clearly exposed me,
O God, how they rode me!
You must want
Eight other guys.

SENATOR GIMBEL: The committee has heard all the evidence it cares to hear. Unquestionably, the gray market in steel is threatening the very foundations of our democratic way of life—well, until November, anyway. But now—let's face it—we've got to write a report of the committee's investigations.

Several Congressmen from the White Collar district of Pittsburgh try to sneak out of the room, but are collared by Capitol police and escorted back to the bench. One is heard to protest sotto voce, "I just wanted to see what the boys at the Downtown Club would have. I was coming right back."

A clerk passes out pen and paper, whereupon two other members put their heads down on the bench and break into uncontrolled sobs. They all write, reluctantly, but finally with forced brightness and discernable degree of embarrassment, they struggle to their feet and decide to make the best of it, with a nod for "When Day is Done":

Now we're all through
With J & L
And Bethlehem.
With Moreell
And Inland, too,
And Fairless, Ben.
We're sorry
We did it—
Let's be friends
All the same.
Gray markets
Are sure-fire
For hearings—
How can we
Be blamed?
We know you're right
Supplies are tight—
You're in a fix.
You've done your best,
Now take a rest
From politics
But we can't miss
Walter Reuther's hiss
Our whole terms through—
So don't go far, boys,
We'll be seeing you.

SENATOR GIMBEL: Last one out is a rotten egg!

The committee members all break for the door together, jostling each other in their haste to make a fast exit. And none too soon, either, for the producers, their dander finally aroused, are grimly advancing toward the group in a flying-V formation. Their mutual indignation seems to have re-united them, for the man at the apex of the V is—Plentiful Producer.

Walter S. Tower Cites Raw Material Problems

New York

• • • **Some of the problems** of obtaining increased quantities of raw materials, required for the operation of the steel industry's enlarged capacity, are still to be solved, said Walter S. Tower, president American Iron and Steel Institute, speaking before a meeting of the New York section, American Institute of Mining and Metallurgical Engineers.

Mr. Tower pointed out that the recent and prospective expansions of capacity will be valueless as regards increased output of steel, if increased quantities of raw materials are not forthcoming. By the end of 1949 he visualizes a capacity of 96 million tons. To produce at this capacity "the industry would need about 115 million tons of iron ore, more than 100 million tons of coal, a minimum of 20 million tons of market scrap, and huge quantities of fuel oil, natural gas and electrical energy. The industry has not had such supplies of materials in any year."

Unsatisfactory quality of coal and tight supply and unsatisfactory quality of scrap were listed by Mr. Tower as "major problems which have already cropped up in the industry's assembly line of materials."

Federal-Aid Projects Awaiting Construction

Washington

• • • **Federal-aid projects** for construction of 7,000 miles of highway and the building of 1233 bridges have been blue-printed and approved by the government for contract letting as soon as the construction industry can handle them and materials are in sight.

At present, 12,600 miles of highway and more than 2600 bridges are under construction as federal-aid projects exclusive of the 44,700 miles of highway work authorized last year as purely state projects.

Exclusive of bridge-building, on the basis of the Federal Works Agency formula for the composite mile of road, existing and proposed federal aid road contracts will require approximately 200,000 tons of reinforcing and structural steel.

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Industrial Briefs . . .

• EXPORT AGENTS—Steel Export & Import Co. of 250 W. 57th St., New York, has announced its appointment as exclusive export agents for the Meridian Steel Co.

• WEST COAST PLANT—Butler Mfg. Co., Kansas City, Mo., fabricator of steel and other metal products, has purchased a factory building at Richmond, Calif., in order to better serve its customers in the Pacific Coast states.

• TRACKAGE FOR SALE—WAA is offering for sale to the highest bidder 16,500 track ft of 75 lb rail with the track accessories, and it must be removed by the purchaser from the Green River Ordnance plant near Dixon, Ill. Bids will be accepted until Feb. 16.

• PARKER DISTRIBUTOR—B. W. Rogers Co., Akron, Ohio, has been appointed distributor for industrial tube fittings and valves manufactured by the Parker Appliance Co., Cleveland.

• TO RECEIVE MEDAL—Egbert H. Ballard, retired foundries-pattern shops superintendent of the Everett and Lynn plants of the General Electric Co. will be presented the William H. McFadden gold medal by the American Foundrymen's Assn., at its congress and show in Philadelphia, May 3-7, in recognition of personal contributions to the advancement of the castings field.

• INCREASES CAPACITY — The Nerl Corp. which has recently changed its name to the Nerl Heat Treat Corp. has purchased the heat treating facilities owned by the South Bend Tool & Die Co., Inc., at 1824 Franklin St., South Bend, Ind., and has begun operations there.

• TOOL STEEL WAREHOUSE—A. Milne & Co., New York, has opened a tool steel warehouse at 11110 Avon Ave., Cleveland.

• SALES AGENT — The Miller Steel Co., Inc., 40-50 Montgomery St., Hillside, N. J., has been appointed sales agent for Ward Steel Co., Boston, for the distribution of spring steels in the New York territory.

• CHANGES NAME—The Industrial Equipment Co., with offices in Buffalo, Rochester and Syracuse, has changed its name to the Tri-Line Corp. and will continue to represent the Watson-Stillman Co., manufacturers of hydraulic machinery.

• PENINSULAR STEEL GROWS—Peninsular Steel Co., Detroit, has opened a new warehouse at 2531 Burton Ave., Indianapolis. A complete stock of tool steel, drill rod, and cold-drawn steel will be carried.

• REPRESENTATIVE — Lester-Phoenix, Inc., Cleveland, distributors of injection molding and die casting machines, has announced that it is now being represented in the Detroit area by Thoreson-McCosh, 1115 Book Bldg., Detroit 26.

• COMPLETES NEW PLANT — Camcar Products Co., Rockford, Ill., has announced the completion of its modern new one-story plant for the manufacture of special and standard screw products. Executive and sales offices are at 919 N. Michigan Ave., Chicago.

• ACQUIRES FIRM—Line Material Co., South Milwaukee, Wis., electrical equipment, has purchased the Kyle Corp. in that city and will operate it as the Kyle Div.

• CONSULTING ENGINEER—Leslie A. Touzalin has been appointed consulting engineer and will contact blast furnace operators and engineers on behalf of the Great Lakes Carbon Corp., Niagara Falls, N. Y.

Increasing Production Crude Oil by Pumping Oil Fields in Reverse

Pittsburgh

• • • **The oil industry** is today increasing production of crude oil in many operating areas by pumping the oil fields in reverse, Gulf Oil Corp. disclosed recently.

Pressure maintenance, as oil men call the procedure, is bringing as much as 10 to 50 pct more oil to the surface—in the fields where it is practical—than would normal development methods alone.

Now being undertaken by most major oil companies, pressure maintenance entails the pumping of natural gas or water—or both—into the depths of an oil producing area. This maintains the reservoir pressure, which forces the oil to flow through its underground beds and up the oil well shaft.

If the pressure were not so maintained, it would drop off as oil was recovered. Eventually pressure could fall to a point where the oil no longer flowed toward the well; and this remaining oil would be lost to production.

A considerable number of pressure maintenance operations are now being undertaken jointly by companies producing from the same pool. Gulf reported it is engaging in such joint pressure maintenance operations in Eastern Venezuela; Haynesville, La.; West Pampa, Tex.; Paloma, Calif.; West Edmond, Okla.; and West Cement, Kansas.

BLS Reports 2 Million Workers Injured in 1947

Washington

• • • **The equivalent** of full-time annual employment of 780,000 workers was lost last year as the result of accidents at work, according to preliminary estimates of the Bureau of Labor Statistics. The two million workers injured, however, represented only a negligible increase over 1946.

A three percent rise in fatalities from work hazards increased the number from 16,500 in 1946 to 17,000 last year. This increase is largely accounted for in two disasters, the Texas City explosion and Centralia mine disaster.

Weekly Gallup Polls . . .

Public Favors Return to Price Control and Rationing

Princeton, N. J.

• • • **With political** implications of high living costs much in the minds of all senators and congressmen, the weight of voter opinion today favors a return to rationing and price control, according to George Gallup, director, American Institute of Public Opinion.

Throughout the country representative voters were interviewed by institute reporters who asked:

"Do you think the government should or should not put rationing and price controls on some products?"

The national averages:

	Pct
Approval	48
Qualified approval	3
Disapproval	41
No opinion	8

Qualifications reported by field reporters are significant, and, in general, represent the major blocks to congressional action on prices. The biggest "if" in the minds of voters who qualify their approval is: "If we can have price control without rationing."

Other qualifications are: "If the black market can be eliminated; if the law can be impartially and honestly administered: and if controls are placed on all items, not just some."

This being a presidential election year when Washington's ears are attuned to votes, the opinion of farmers has an important bearing on the fate of price control legislation. And farmers, in contrast to the rest of the population, oppose both rationing and controls by a vote of almost two to one.

On the other hand, manual workers, on whom candidates also must keep a wary eye, favor new control legislation almost as strongly as farmers oppose it.

Votes by occupational groups are shown in the following tables:

Occupation	Approve Rationing and Controls	Qualified Approval	Disapprove	No Opinion
	Pct	Pct	Pct	Pct
Prof. & Bus.	47	2	47	4
White collar	49	3	41	7
Farmers	31	1	56	12
Manual workers	53	3	34	10

The same divergence of viewpoints exists between people in the smaller communities in the country and the larger cities:

Size of Town	Approve	Qualified Approval	Disapprove	No Opinion
	Pct	Pct	Pct	Pct
Farmers	31	1	56	12
Under 10,000	45	3	43	9
10,000 to 100,000	52	3	37	8
100,000 & over	55	3	35	7

As in past surveys of voter opinion on price controls the present poll reveals strong disagreement between Democrats and Republicans, as follows:

	Approval	Qualified Approval	Disapproval	No opinion
	Pct	Pct	Pct	Pct
Democrats	57	2	32	9
Republicans	37	3	54	6

Historically, the people of this country have been ready to submit to price controls long before their representatives voted the necessary legislation. Two months before Canada adopted a price-wage control program in 1941, and more than a year before the United States took similar steps, the majority of American voters were ready to see similar curbs put into effect in this country.

If Congress bows to Administration wishes and reimposes controls, the United States again will be following the lead of the Dominion government. In answer to increasing complaints from consumers over surging food costs, the Canadian government on Jan. 16 reimposed ceilings on the prices of meat and butter.

A survey made by the Canadian Institute of Public Opinion just before the governmental action showed that 76 pct of Canadian voters wanted price controls back again and a majority wanted controls placed on all goods.

The American public lost faith in the wartime set of controls between the spring and fall of 1946. An institute survey in May of that year showed seven out of ten voters favoring retention of controls. By early October a slight majority voted to do away with them. President Truman abolished price control on meat Oct. 14 when he asked OPA to speed decontrol generally.

Truman Leads Dewey and Taft In National Popularity; Dewey Vote Appeal Strongest in East

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• • • **Geographically,** Gov. Thomas E. Dewey's strength as a presidential candidate comes largely from the East, while Sen. Robert A. Taft's appeal is more Middle Western.

Henry A. Wallace, third party candidate, gets a measure of support from nearly all sections outside the South, but on the whole does a little better on the East and West coasts than elsewhere.

The geographical strength of various possible candidates for 1948 is shown in institute "trial heat" races conducted from coast to coast. Voters in all 48 states were asked how they would vote if an election were held today with Truman on the Democratic ticket and Wallace on a third party ticket running against each of the possible GOP nominees: Governor Dewey and Senator Taft. Here is the way the races

(CONTINUED ON PAGE 139)

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Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

2000 **Tons,** Marcus Hook, Pa., Sun Oil Co., buildings, to Belmont Iron Works, Philadelphia.

980 **Tons,** Trenton, N. J., Crescent Insulated Wire & Cable Co., building, previously cancelled, awarded to Bethlehem Steel Co., Bethlehem.

400 **Tons,** Reading, Pa., building for Parish Pressed Steel Co., to Belmont Iron Works, Philadelphia.

350 **Tons,** Chicago, new plant for I. F. Berlin Printing & Lithographing Co., through A. Epstein & Sons to J. T. Ryerson & Son, Inc., Chicago.

305 **Tons,** Des Moines, building for International Harvester to Pittsburgh-Des Moines Steel Co., Des Moines.

200 **Tons,** Aimes, Iowa, 110-ft plate girder span for Chicago & Northwestern R.R. to American Bridge Co., Pittsburgh.

115 **Tons,** Eau Claire, Wis., bridge No. 0701-2, Price County, through L. J. Arnold, Inc., to Bethlehem Steel Co., Bethlehem.

• • • **Fabricated steel inquiries** this week included the following:

4540 **Tons,** Pittsburgh, tunnel and bridge, Pennsylvania Dept. of Highways, Mar. 12.

2700 **Tons,** State of Pennsylvania, beam bridges, Pennsylvania Dept. of Properties & Supplies, bids in.

2400 **Tons,** Huntingdon County, Pa., two bridges, Pennsylvania Dept. of Highways, bids in.

1260 **Tons,** Montezuma, Ind., bridge No. 2938, State of Indiana, bids close Feb. 17.

1000 **Tons,** Forty Fort, Pa., warehouse for American Stores, Inc., Feb. 12.

250 **Tons,** New Brunswick, N. J., agricultural college building, State of New Jersey, Feb. 24.

220 **Tons,** Madison County, Ind., bridge No. 2943, State of Indiana, bids close Feb. 17.

150 **Tons,** Camden, N. J., transfer bridge for Pennsylvania R.R., Feb. 22.

130 **Tons,** Richmond, Ind., bridge No. 2929, State of Indiana, bids close Feb. 17.

125 **Tons,** Philadelphia, warehouse for Detroit Steel Products Co., Feb. 14.

100 **Tons,** Philadelphia warehouse for Hill Chase Co. Feb. 6.

• • • **Reinforcing bar awards** this week included the following:

300 **Tons,** Morgantown, W. Va., coal bins for Weirton Coal Co. through McDonald Engineering Co., Chicago, to Bethlehem Steel Co., Bethlehem.

300 **Tons,** East Peoria, Ill., Fond du Lac Dam, U. S. Engineers, to Central Engineering Co., Davenport, Iowa.

200 **Tons,** Milwaukee, sixth ward housing project through Siesel Construction Co., Milwaukee, to Bethlehem Steel Co., Bethlehem.

140 **Tons,** Grant and Douglas Counties, Wash., highway construction on P.S.H. 10, Trinidad Easterly, through Erickson Paving Co. to Northwest Steel Rolling Mills, Seattle.

• • • **Reinforcing bar inquiries** this week included the following:

3000 **Tons,** Harlan County, Neb., dam through U. S. Engineers' office, Kansas City, previously reported, Guy F. Atkinson Co., San Francisco, has been announced low bidder.

1000 **Tons,** Fort Wayne, Ind., U. S. Veterans' Hospital, G. K. Newberg Construction Co. of Chicago, low bidder.

340 **Tons,** Bald Hill, N. D., dam through U. S. Engineers has been postponed until Feb. 15.

• • • **Piling awards** this week included the following:

340 **Tons,** East Peoria, Ill., Fond du Lac Dam., U. S. Engineers through Central Engineering Co., Davenport, Iowa, to Carnegie-Illinois Steel Corp., Pittsburgh.

Coming Events

Feb. 10-11 **Pressed Metal Institute,** annual meeting, Buffalo.

Feb. 15-19 **American Institute of Mining and Metallurgical Engineers,** annual meeting, New York.

Feb. 28, March 1-2 **American Metallizing Contractors Assn.,** meeting, Cleveland.

Mar. 1-4 **American Society of Mechanical Engineers,** meeting, New Orleans.

Mar. 3-5 **Society of Automotive Engineers,** national passenger car meeting, Detroit.

Mar. 15-19 **ASTE Industrial Exposition,** Cleveland.

Mar. 18-19 **Magnesium Assn.,** annual meeting, New York.

Apr. 5-8 **Southern Machinery and Metals Exposition,** Atlanta.

Apr. 5-8 **National Assn. of Corrosion Engineers,** annual conference and exhibition, St. Louis.

Apr. 7-9 **American Society of Civil Engineers,** meeting, Pittsburgh.

Apr. 12-14 **Openhearth Steel Committee and Coke Oven, Blast Furnace and Raw Materials Committee, AIME,** annual conference, Pittsburgh.

Apr. 15-16 **Metal Powder Assn.,** annual meeting and exhibit, Chicago.

May 3-7 **American Foundrymen's Assn.,** convention and show, Philadelphia.

May 20-21 **Society of the Plastics Industry,** annual meeting, Atlantic City, N. J.

May 27-29 **Society for Experimental Stress Analysis,** meeting, Pittsburgh.

Allocating to Some Will Short Others

Washington

• • • **Steel has been** trying for 2 years to convince bureaucracy that distribution of steel in one channel can't be increased just now without compensating decreases in other consumer channels. Last week, one government agency, the Office of Defense Transportation, recognized this fact.

ODT summoned steel producers and railway car builders to Washington to map a new production program calling for 14,000 new freight cars per month. Said steel: "It's OK with us, if you'll tell us how we can turn out more steel."

ODT allowed as how it had heard about shortages of steel for farm machinery, housing, etc. The agency looked at steel's production figures and agreed to keep the 10,000 car program in effect for an indefinite period.

Steel is moving to the railroads and car builders at the rate of 240,000 tons per quarter, ODT said. "Steel's cooperation is excellent," one ODT official commented. "We just realized that a 14,000 car figure was out of sight."

Allocation Program

(CONTINUED FROM PAGE 114)

require a million tons of additional steel this year.

Emphasizing that "no other general programs for steel are planned at this time," Mr. Harriman stated that there is no inclination to solve all the production problems of the above-mentioned industries. For example, in farm equipment Commerce will concentrate its efforts on items directly affecting production of scarce foods. He further stated that Commerce does not contemplate allocation to end-users generally nor will the agency act as an expediter for individual firms.

Mr. Harriman also reviewed the department's efforts to increase steel production by aiding in raw material procurement, with particular emphasis on scrap. Conservation measures now underway were also outlined by Mr. Harriman. These include a plea to the railroads to defer maintenance and construction which can be put off without endangering operating efficiency. Industry will also be asked to defer construction which will not stimulate production.

Engineers Plug for Technical Progress at Annual Meeting

Steel Shortages and Rising Production Costs Among Current Obstacles

o o o

By W. G. PATTON
Detroit Regional Editor

o o o

Detroit

• • • **Optimism** was the keynote at the annual meeting of the American Society of Automotive Engineers at Detroit, Jan. 12 to 16.

If the assembled engineers and executives learned nothing else at their recent meeting they must have been impressed with the tremendous technical strides the industry is taking—technical progress that should enable this country to meet its petroleum problems, its paint problems, its growing need for high-strength, fatigue-resisting steels and metals or other materials that will withstand the high temperatures encountered in gas turbine operation.

Even with current domestic consumption exceeding 5 million bbl per day, our oil reserves are larger than at any other time in the history of this country, W. M. Holaday of the Socony-Vacuum Laboratories, New York, told the assembled engineers. Our chief problems at the moment, he said, are spot shortages resulting from the lack of transportation and refining facilities in certain areas, steel shortages and sharply rising production costs.

Mr. Holaday qualified his optimism about the long term outlook for the oil industry by pointing out that 84 pct of the increase in reserves in 1946 was made possible by extensions and additions to existing fields and only 16 pct represented "new finds." However, he added that exploration of new areas and drilling of deeper wells is giving us more oil (although at constantly increasing cost).

The industry is also optimistic about the possibilities of hitherto unexplored territories such as tidelands, off-shore areas and even Rocky Mountain areas heretofore considered too remote and inaccessible. Recently, he pointed out, oil was discovered 18 miles from shore and such drilling is already going on in several locations.

Mr. Holaday believes the industry is likely to move rather slowly in increasing the octane rating of its products but suggests that automotive engineers may obtain increased economy in motor cars through the installation of dual fuel systems, one to provide fuel high in performance value for short periods of time and the other to supply lower quality fuel for normal cruising operations.

Another optimistic note at the convention was the indication that new porcelains show considerable promise for use at temperatures above 1500° F for gas turbine service. According to R. F. Geller of the National Bureau of Standards, the new porcelains can replace metallic alloys at temperatures above 1500° F in so far as strength and creep requirements are concerned; however, they have yet to demonstrate their ability to resist thermal and mechanical shock.

The author sees these new

(CONTINUED ON PAGE 135)

50 YEARS AGO

THE IRON AGE, *February 3, 1898*

• "National politics can encourage industry and commerce, but it remains for the people to project and carry them on. If these policies stimulate industrial development and energy, the people can be safely trusted to do the rest. The government, however, is restricted in its power to promote industry. It can aid commerce, but not create it. It can widen and deepen its rivers and harbors and improve its highways but the people must supply the goods and the means by which to transport them."

• **"Report on the Iron and Metal Trades—Markets in the leading pig iron producing centers continue in a nervous condition created by the doubt of whether consumption can cope with the current heavy output. The sanguine have been punished so severely and so frequently during the past few years that few have the courage of their convictions. Nothing would carry more weight than a falling off in production, but that is not likely to come at an early date. . . . In steel billets, the market situation is clouded to some extent by the determined efforts of powerful interests to get the market into shape for large purchases for delivery during the second quarter of the year."**

• "The annual report of Wells, Fargo & Co. on precious metals produced in the states and territories west of the Mississippi during 1897, shows an aggregate value of $153,435,469."

• **"The Illinois Steel Co. is steadily improving its financial position. The note for $1.5 million given a year ago fell due Friday and the company had no trouble in taking care of it."**

• "The largest industrial company ever incorporated in New York state is the International Paper Co., Corinth, N. Y. Capital stock of the new corporation, which is familiarly dubbed the 'American Paper Trust' is placed at $45 million."

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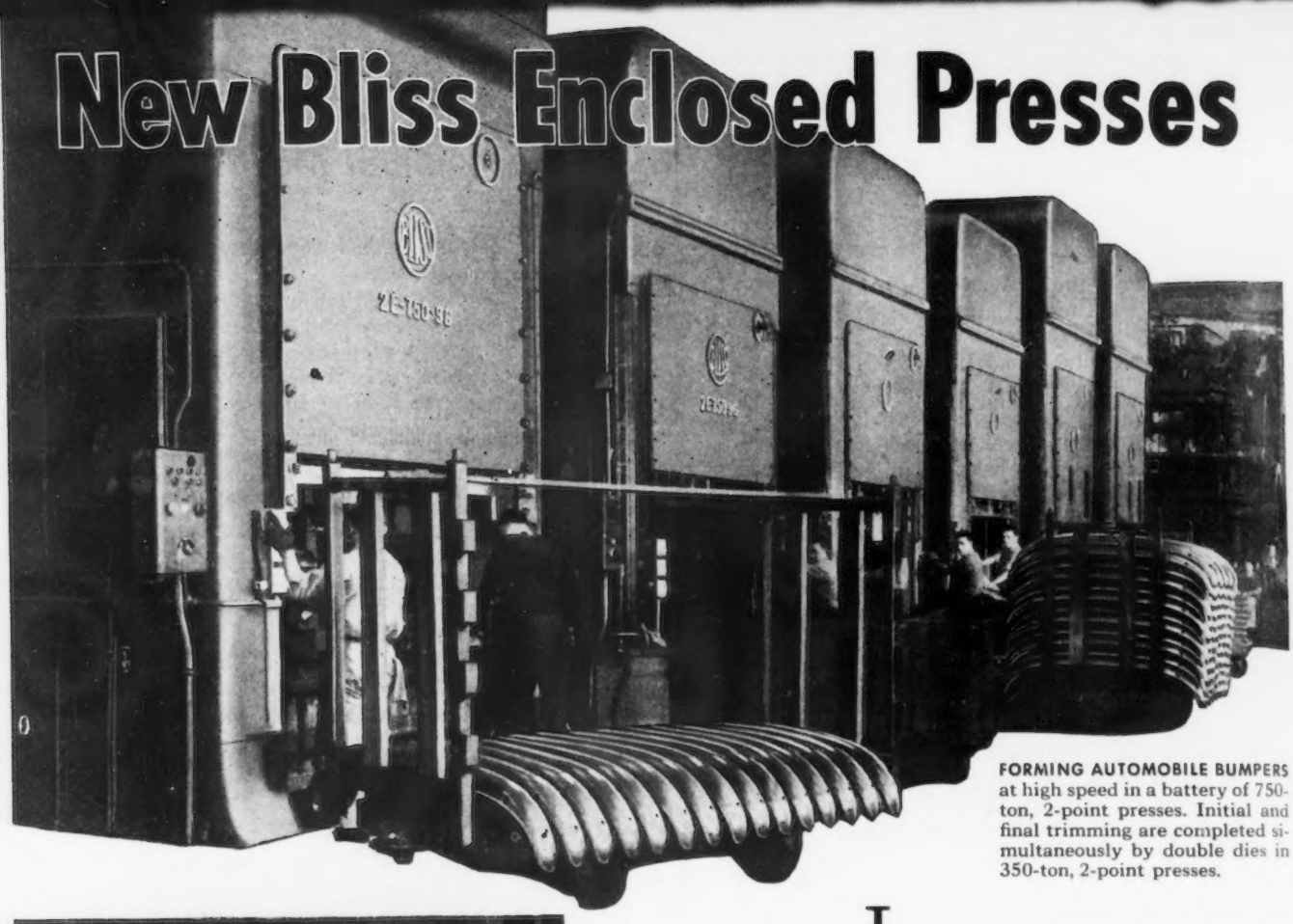
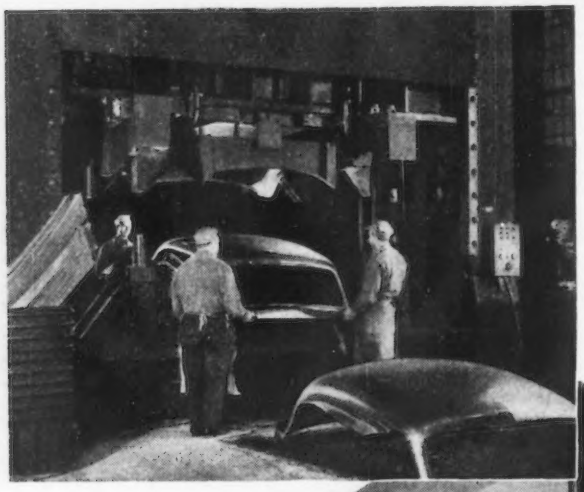
New Bliss Enclosed Presses



FORMING AUTOMOBILE BUMPERS at high speed in a battery of 750-ton, 2-point presses. Initial and final trimming are completed simultaneously by double dies in 350-ton, 2-point presses.



ENTIRE TOP OF CAR being trimmed in a Bliss 4-point single action press.

FULLY AUTOMATIC PRODUCTION of hub caps in Bliss 2-point press with transfer feed and progressive dies.

IT takes a *complete* line of modern equipment like these new Bliss Enclosed Presses to keep pace with all the changing requirements of new tooling...the intricate shapes and die designs...multiple operations...the increasing trend to automatic production cycles and more economical materials handling methods.

All of these important factors are engineered into the Bliss Enclosed Press line. For example:

Specially designed roll, push, transfer or stack feeds for automatic or semi-automatic operation.

Transfer mechanisms for simple changeover from single to progressive die work.

Latest type push-button operated air friction clutches for intermediate or continuous operation, inching, stop-and-start at any point of the stroke.

Open back designs for feeding front-to-back or left-to-right.

Pneumatic or hydro-pneumatic cushions for deep drawing of complicated shapes.

And there's the added combination of operator safety, improved appearance and cleanliness of operation.

Look over the details of some of the presses described at the right. Let a Bliss Sales Engineer help you to select the right press for your retooling needs ...one-, two-, or four-point; single-, double-, or triple-action...from Bliss' 124 sizes and capacities. If special-type presses are called for, Bliss can help you, too. For Bliss builds more types and sizes of presses—mechanical and hydraulic—than any other company.

Bliss builds more

...as modern as your new tooling

124 Standard Sizes and Capacities to meet every retooling and production need

SINGLE ACTION PRESSES:

1- 2- AND 4-POINT PRESSES: For piercing, blanking, forming, trimming and restriking operations or double action drawing with Bliss Marquette Die Cushions.

4-POINT ECCENTRIC PRESSES: For heavy gauge forming, stamping, swaging, piercing or blanking.

4-POINT UNDER DRIVEN PRESSES: For large one-piece stampings or multiple die operations. Drive located under bed, provides greater accessibility to working parts, requires less headroom. Permits repair and maintenance without interference with production.

GAP FRAME ENCLOSED PRESSES: Open back design permits feeding front-to-back or left-to-right, simplifies materials handling. Available in a wide variety of sizes.

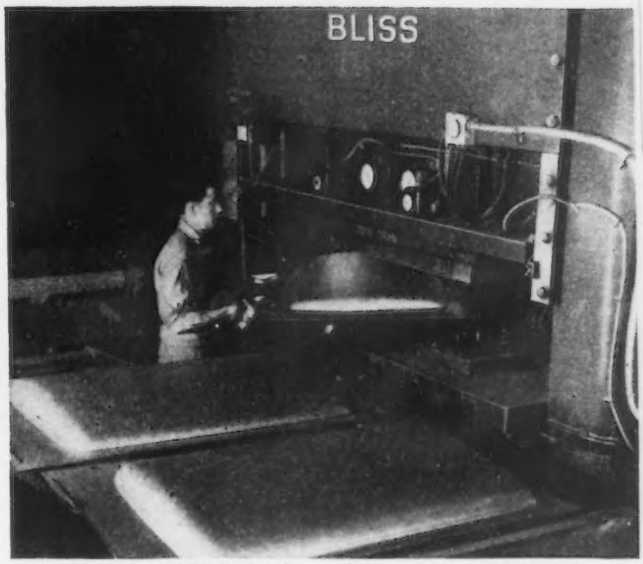
DOUBLE ACTION TOGGLE PRESSES:

1- AND 2-POINT: For deep drawing or forming of large or small stampings. Can be equipped with cushions for complicated deep drawing or to provide the equivalent of a third action for shallow reverse draws.

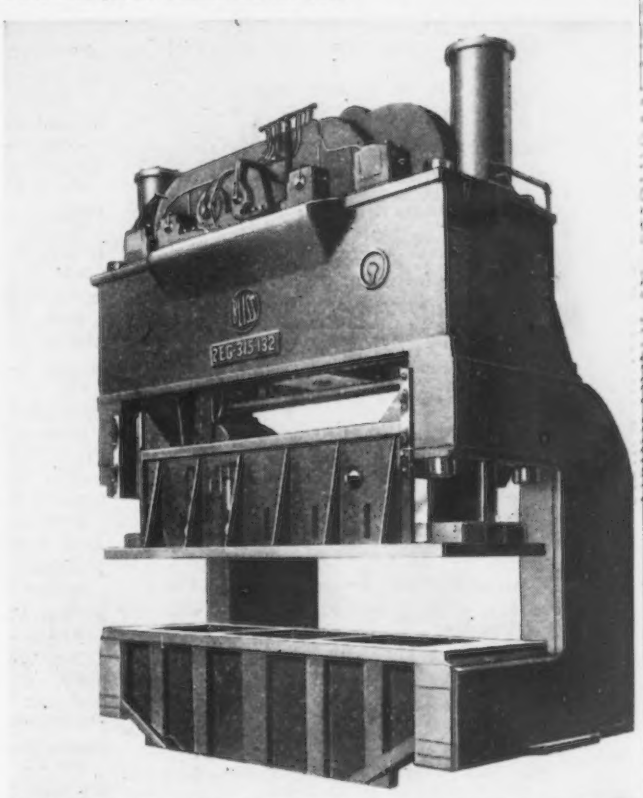
TRIPLE ACTION TOGGLE PRESSES:

Can be supplied with an independently driven third action if necessary.

We're certain you'll want to know more about these presses and we're ready to supply complete information. Just tell us what types you're interested in.



REFRIGERATOR DOORS drawn in a 350-ton single action press with Bliss Marquette Cushion in the bed.



TWO-POINT GAP FRAME PRESS of 315-ton capacity—132" between uprights; all steel. Four shrunk tie rods connect crown to body. All gearing runs in oil. Speed is reduced to one-half normal at mid-stroke, accelerated to full speed at bottom stroke and return cycle.

E. W. BLISS COMPANY, 450 AMSTERDAM AVENUE, DETROIT 2, MICHIGAN

Mechanical and Hydraulic Presses, Rolling Mills, Can and Container Machinery

WORKS AT: Toledo, Cleveland, Salem, Ohio; Hastings, Michigan; Englewood, N. J.; Derby, England; St. Ouen sur Seine, France. SALES OFFICES AT: Detroit, Hastings, Michigan; New York, Rochester, N. Y.; Cleveland, Dayton, Toledo, Ohio; Philadelphia, Pittsburgh, Pa.; Chicago, Illinois; Boston, Mass.; New Haven, Conn.; Windsor, Ontario.

STAY AHEAD WITH *Bliss*

types and sizes of presses than any other company

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The Iron Age Metalworking Buyers' Guide

... A sixth section of the Buyers' Guide is presented herewith. Previous sections have appeared weekly starting with the Annual Review Issue, Jan. 1, 1948, p. 208. This guide has been developed to give executives and purchasing agents of the metal working industry a directory with a much finer breakdown in classifications than has been heretofore available. Additional sections of the guide will be published weekly.

C

CONTINUED

JOHNSON BRONZE CO., 505 S. Mille St., New Castle Pa.

Judd, H. L., Co., Inc., 87 Chambers St., New York 7.

Keckley O. C., Co., Springfield Ill.

Knowles, F. S., 77 W. Washington St., Chicago 2.

KOPPERS COMPANY, INC., Koppers Bldg., Pittsburgh 19.

Little Giant Co., 130 Rock St., Mankato, Minn.

Lumen Bearing Co., 197 Lathrop St., Buffalo 12.

Mueller Brass Co., 1925 Lapeer Ave., Port Huron, Mich.

National Electric Welding Machines Co., 1846-1860 N. Trumbull St., Bay City, Mich.

PARKER, CHARLES, CO., Meriden, Conn.

Saginaw Bearing Co., 930 S. Water St., Saginaw, Mich.

Sandusky Foundry & Machine Co., Sandusky, Ohio.

Textile Machine Works, Reading, Pa.

Universal Foundry Co., Oshkosh, Wisc.

Western Brass Mills, Div. of Olin Industries, Inc., East Alton, Ill.

Wood, J. R., Products Corp., 70 Washington St., Brooklyn 1.

WOOD, R. D., Co., Conshohocken, Pa.

Castings, Centrifugal

ALLIS-CHALMERS MFG. CO., 1126 So. 70th St., Milwaukee 1.

Alloy Casting Co., Victor Ave., Champaign, Ill.

AMERICAN BRAKE SHOE CO., 230 Park Ave., New York 17.

American Non-Gran Bronze Co., Berwyn, Pa.

AMPCO METAL, INC., 1745 So. 38th St., Milwaukee.

BETHLEHEM STEEL CO., Bethlehem, Pa.

BLAW-KNOX CO., Farmers Bank Bldg., Pittsburgh, Pa.

Burnside Steel Foundry Co., 1300 E. 92nd St., Chicago 19.

Commerce Pattern Foundry & Machine Co., 7450 Melville at Green, Detroit 17.

Farrell-Cheek Steel Co., Sandusky, Ohio.

Gilhams, H. S., & Co., 2312 Lincoln Liberty Bldg., Philadelphia 7.

INTERNATIONAL NICKEL CO. INC., 67 Wall St., New York 5.

LEBANON STEEL FOUNDRY, Lebanon, Pa.

Lumen Bearing Co., 197 Lathrop St., Buffalo 12.

MICHIANA PRODUCTS CORP., Michigan City, Ind.

Mueller Brass Co., 1925 Lapeer Ave., Port Huron, Mich.

National Malleable & Steel Castings Co., Quincy and Baldwin Road, Cleveland.

OHIO STEEL FOUNDRY CO., P. O. Box 900, Lima, Ohio.

Sandusky Foundry & Machine Co., Sandusky, Ohio.

Stoody Co., 1149 W. Slauson Ave., Whittier, Calif.

WOOD, R. D., Co., Conshohocken, Pa.

Castings, Corrosion, Heat Resisting

Alloy Casting Co., Victor Ave., Champaign, Ill.

AMERICAN BRAKE SHOE CO., 230 Park Ave., New York 17.

AMPCO METAL, INC., 1745 So. 38th St., Milwaukee.

BETHLEHEM STEEL CO., Bethlehem, Pa.

BLAW-KNOX CO., Farmers Bank Bldg., Pittsburgh, Pa.

Burgess-Parr Co., Foot of Exchange St., Freeport, Ill.

Burnside Steel Foundry Co., 1300 E. 92nd St., Chicago 19.

Centre Foundry & Machine Co., Wheeling, W. Va.

Chicago Steel Foundry Co., Kedzie Ave. & 37th St., Chicago 32.

Driver-Harris Co., P. O. Drawer #31, Harrison, N. J.

Duriron Co., Inc., Dayton 1.

Empire Steel Castings, Inc., Box 139, Reading, Pa.

FARREL-BIRMINGHAM CO., INC., Ansonia, Conn.

Frank Foundries Corp., 21st St. & Second Ave., Moline, Ill.

Gilhams, H. S., & Co., 2312 Lincoln Liberty Bldg., Philadelphia 7.

JESSOP STEEL CO., Washington, Pa.

HOSKINS MANUFACTURING CO., 4447 Lawton Ave., Detroit 8.

INTERNATIONAL NICKEL CO. INC., 67 Wall St., New York 5.

LEBANON STEEL FOUNDRY, Lebanon, Pa.

Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Lumen Bearing Co., 197 Lathrop St., Buffalo 12.

MICHIANA PRODUCTS CORP., Michigan City, Ind.

National Malleable & Steel Castings Co., Quincy and Baldwin Road, Cleveland.

OHIO STEEL FOUNDRY CO., P. O. Box 900, Springfield, Ohio.

Sivyer Steel Castings Co., 1675 S. 43rd St., Milwaukee 14.

Sterling Alloys, Inc., Woburn, Mass.

Vulcan Iron Works, Wilkes-Barre, Pa.

Wall-Colmonoy Corp., 714 Fisher Bldg., Detroit 2.

Western Foundry Co., 3634 S. Kedzie Ave., Chicago 32.

WOOD, R. D., CO., Conshohocken, Pa.

Castings, Die, Aluminum

Accurate Die Casting Co., The, 3089 E. 80th St., Cleveland 4.

Advance Pressure Castings, Inc., 34 N. 15th St., Brooklyn.

ALUMINUM CO. OF AMERICA, Gulf Bldg., Pittsburgh.

Aurora Metal Co., 614 W. Park Ave., Aurora, Ill.

Badger Die Casting Co., 201 W. Oklahoma Ave., Milwaukee 7.

Borman Casting Corp., St. Joseph, Mich.

Cincinnati Die Casting Co., 2117 Spring Grove Ave., Cincinnati.

Cleveland Hy-Pressure Casting Co., 5400 Brookpark Rd., Cleveland 9.

Congress Die Casting Div., 3750 E. Outer Drive, Detroit.

Dayton Die Casting Co., 111 Front St., Dayton 2, Ohio.

DOEHLER-JARVIS CORP., 386 4th Ave., New York.

Dollin Corp., 610 21st St., Irvington 11, N. J.

ELECTRIC AUTO-LITE CO., Die Casting Div., Woodstock, Ill.

Federal Die Casting Co., 2222 Elston Ave., Chicago 14.

FLORIDA DIE CASTING FOUNDRY, P. O. Box 1589, Orlando, Fla.

HARVILL CORP., 6251 Century Blvd., Los Angeles 43.

Heick Die Casting Corp., 6550 Diversey Ave., Chicago 35.

Hoover Co., The, Maple St., North Canton, Ohio.

Krone Die Casting Co., Paul, 1815 Koster Ave., Chicago 39.

Latrobe Die Casting Co., North St., Latrobe, Pa.

Madison-Kipp Corp., 210 Waubesa St., Madison, Wis.

Mason, L. E., Co., 98 Business St., Hyde Park 36, Mass.

McGill Mfg. Co., Metal Div., Valparaiso, Ind.

Michigan Die Casting Co., 8651 E. 7 Mile Rd., Detroit 12.

Milwaukee Die Casting Co., 1015 N. 4th St., Milwaukee 3.

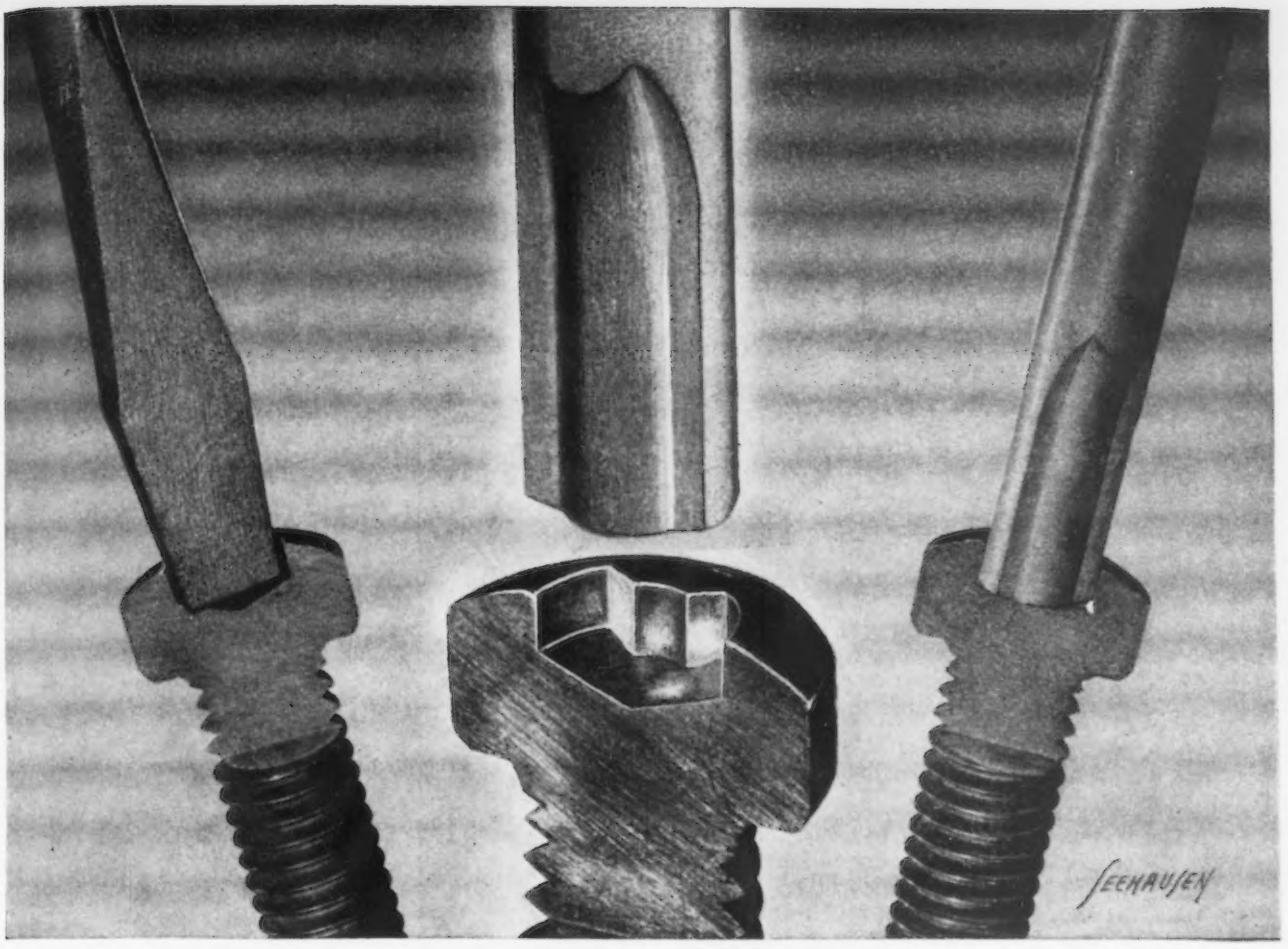
Monarch Aluminum Mfg. Co., Dycast Products Div., 9301 Detroit Ave., Cleveland.

Mt. Vernon Die Casting Corp., 118 Pearl St., Mount Vernon, N. Y.

National Molded Products Co., 1130 E. 22nd St., Cleveland 17.

New Products Corp., 448 N. Shore Drive, Benton Harbor, Mich.

Newton-New Haven Co., New Haven 4, Conn.



Here's How CLUTCH HEAD *Brings New Safety, New Speed in Line Assembly*

Q. What is the main cause of driver skidding? **A.** *"Ride-out" as set up by tapered driving.*

Q. How does CLUTCH HEAD overcome this "ride-out"? **A.** *By elimination of the tapered recess.*

Q. How does the CLUTCH HEAD engagement differ? **A.** *With straight sides of driver matching straight recess walls.*

Q. What safety benefit results from this engagement? **A.** *No slippage, so no damage to operators or work.*

Q. Does this eliminate need for end pressure? **A.** *Yes. No "ride-out" to combat; no end pressure; no skids.*

Q. Do CLUTCH HEAD users support this skid-free claim? **A.** *Many. Norge says "Cabinet damage eliminated."*

Q. What of this feature as a fatigue factor? **A.** *Effortless driving means more screws driven per day.*

Q. How does the Center Pivot Column add to safer driving? **A.** *It prevents canting by guiding bit into dead-center entry.*

Q. Why is CLUTCH HEAD "America's Most Modern Screw"? **A.** *Because it has features unmatched by any other screw.*

Q. What are these features?

A. *They include a recess engagement to match the ruggedness of the Type "A" Bit construction for driving up to 214,000 screws . . . non-stop; simple 60-second bit reconditioning; the Lock-On for easy one-handed driving, and basic design for common screwdriver operation.*

CLUTCH HEAD - SCREWS -

Q. And how may we check them?

A. *You may check all of these features by sending for package assortment of screws, sample Type "A" Bit, and illustrated Brochure. These will come to you by mail and will give you an understanding why CLUTCH HEAD users report 15% to 50% increases in assembly production.*

UNITED SCREW AND BOLT CORPORATION

CLEVELAND 2 CHICAGO 8 NEW YORK 7

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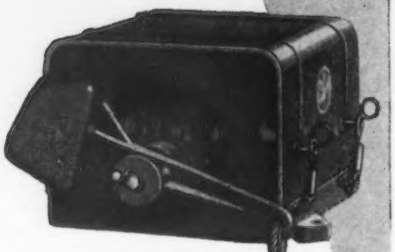
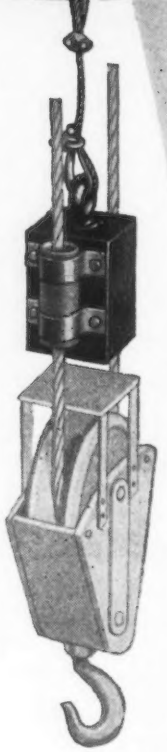
For Better Crane Performance

EC&M YOUNGSTOWN SAFETY LIMIT STOP

Eliminates Fear of Overtravel -- Permits High Lifts

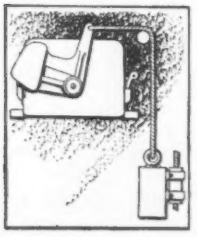
This Safety Limit Stop offers protection for men and equipment saves time and reduces costs.





1. Enables the operator to do better work, because the fear of an over-hoisting accident is removed.
2. Raises "working - ceiling" of area served by crane, because hook stops quickly when the limit stop trips.
3. Re-sets automatically—hook lowers out of the danger zone the instant the hoist-controller in the cab is reversed. Transfer from "tripped" to "normal" connections is rapid. The amount of travel between these two positions is low.
4. Stretching of the hoisting cables does not affect the tripping-point—the Limit Stop is operated directly by the hook block.
5. Compact, easy to mount—and only a single suspended-weight.
6. Disconnects hoist - motor from the line—high interrupting capacity insures positive opening of the hoist motor current.

Youngstown Safety Limit Stops are built for both a-c and d-c hoist motors and are easily applied to either new or old cranes. As a check against human error, these limit stops have no equal. Write for your copy of Bulletin 1032.



◀ Optional Style—with offset weighted-arm which eliminates intermediate sheaves when Stop is not mounted directly over crane hook-block. Available on all sizes of EC&M Youngstown Limit Stops.

EC&M's Fiftieth Anniversary

THE ELECTRIC CONTROLLER & MFG. CO.

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BUYERS GUIDE

Parker White Metal & Machine Co., 23rd St., Erie, Pa.

Phoenix Die Casting Co., 21 Illinois St., Buffalo.

Precision Castings Co., Inc., Fayetteville, N. Y.

Pressure Castings Inc., 21500 St. Clair Ave., Cleveland.

Rupert Diecasting Co., 1655 Cleveland Ave., Kansas City, Mo.

Sterling Die Casting Co., 743 39th St., Brooklyn 32.

Superior Die Casting Co., 17325 Euclid Ave., Cleveland.

Warner Mfg. Co., 665 Hawthorne St., Glendale 4, Cal.

Western Die Casting Co., 4065 Hollis St., Emeryville 8, Cal.

Castings, Die, Copper and Brass

Advance Pressure Castings, Inc., 34 N. 15th St., Brooklyn 22.

AMERICAN BRAKE SHOE CO., 230 Park Ave., New York.

AMERICAN BRASS CO., THE, Waterbury 88, Conn.

Aurora Metal Co., 614 Park Ave., Aurora, Ill.

Cincinnati Die Casting Co., 2117 Spring Grove Ave., Cincinnati.

Dayton Die Casting Co., 111 Front St., Dayton 2, Ohio.

DOEHLER-JARVIS CORP., 386 4th Ave., New York.

HARVILL CORP., 6251 Century Blvd., Los Angeles 43.

McGill Mfg. Co., Metal Div., Valparaiso, Ind.

New Products Corp., 448 N. Shore Drive, Benton Harbor, Mich.

TITAN METAL MFG. CO., Bellefonte, Pa.

Warner Mfg. Co., 665 Hawthorne St., Glendale 4, Cal.

Warner Die Casting Co., 4065 Hollis St., Emeryville 8, Cal.

Castings, Die, Lead and Lead Alloy

Borman Castings Corp., St. Joseph, Mich.

Chicago Expansion Bolt Co., 2240 Ogden Ave., Chicago 12.

Dayton Die Casting Co., 111 Front St., Dayton 2.

DeCardy Bros. Co., 1806 N. Keeler Ave., Chicago 39.

DOEHLER-JARVIS CORP., 386 4th Ave., New York.

FEDERAL-MOGUL CORP., 11030 Shoemaker Ave., Detroit.

Latrobe Die Casting Co., Unity St., Latrobe, Pa.

Phoenix Die Casting Co., 21 Illinois St., Buffalo, N. Y.

Twin City Die Castings Co., Talmadge Ave., Minneapolis 14.

Western Die Casting Co., 4065 Hollis St., Emeryville 8, Cal.

Castings, Die, Zinc Alloy

AC Spark Plug Div., General Motors Corp., 1300 Dort Highway, Flint, Mich.

Accurate Die Casting Co., The, 3089 E. 80th St., Cleveland 4.

Advance Pressure Castings, Inc., 34 15th St., Brooklyn 22.

ALUMINUM CO. OF AMERICA, Gulf Bldg., Pittsburgh.

Badger Die Casting Co., 201 Oklahoma Ave., Milwaukee 7.

Benton Harbor Malleable Industries, Benton Harbor, Mich.

Borman Castings Corp., St. Joseph Mich.

(CONTINUED ON PAGE 163)

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General Motors Corp. Launches Scrap Drive Among Its Employees

Detroit

• • • **General Motors Corp.** is asking its 365,000 employees and 15,000 dealers as well as plant managers to cooperate in a nationwide scrap drive. All scrap will be handled through established scrap dealers and no effort will be made to channel the scrap to General Motors, according to a company spokesman.

GM is offering no car bonuses or other incentives to its employees who will be notified through GM Folks magazine and newspaper advertising in their plant city of the details of the drive. GM plant managers are being urged to move obsolete or inactive machinery, tools, dies, fixtures and service parts promptly into established scrap channels. Reports of unusual scrap disposals will be sent back to the central GM office.

General Motors vehicles divisions are encouraging their dealers to sponsor local scrap metal drives. Posters for dealer windows and other promotional material will be used. Employees will be asked to turn in their home and farm scrap promptly.

GM divisions will confine their activity to promoting employee interest in giving scrap to charitable organizations or selling it direct to a scrap dealer.

The corporation is urging participants to ask scrap dealers to pass the scrap along promptly to the steel mills.

In cities where there is more than one GM plant, a local chairman will be selected. GM is urging its employees to consider the possibilities of collecting metal scrap through schools. The drive will not be confined to iron and steel scrap; all types of metal scrap is being included in the master plan.

C. E. Wilson, president of General Motors, explains, "Scrap metal is one of our most critical shortages. The lack of it held production of steel down in 1947, and if we cannot increase the flow of scrap metal to the mills, production in 1948 will suffer materially."

The GM president went on to

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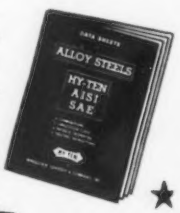
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explain that scrap collections fall off sharply at this time of the year and one of the greatest contributions made by civilians during the war to keep wartime steel output at high levels was scrap metal drives.

Extrusion Molding Process

(CONTINUED FROM PAGE 86)

There naturally was nothing in the textbooks or handbooks defining molded extrusions or showing what the metallurgical or metallographic structure should be.

Those customers who have had the capacity to recognize the merit of the process and help pioneer the use of the molded extrusions in industry have been most helpful. There were times during the early part of the war when the additional special equipment was not available because of delays. The only production equipment was the crude experimental machine and deliveries were extremely slow and uncertain. However, those manufacturers were always understanding and assisted in every way possible, thus contributing largely to the success of the development of the extrusion molding process. They quickly demonstrated the willingness of industry to aid and cooperate with making new processes possible.

Extrusion molding is not the answer to all problems in fabrication, it must and has been serving its apprenticeship as a special production method. To be sure there will always be forgings, sand castings, diecastings, permanent mold castings, conventional extrusions and, of course, molded extrusions.

Home Building Increase

Washington

• • • **Despite the seasonal** November decline in new housing activity, starts for the month still exceeded the same period last year by more than 70 pct. Builders began 80,000 new home units and completed 86,000, according to Commerce Dept. reports.

Completions during November were 3400 above October 1947, 25,000 above November 1946, and brought the total for the first 11 months to 745,000 permanent units.

Engineers Plug Progress

(CONTINUED FROM PAGE 125)

porcelains as suggesting ways and means of increasing the net efficiencies of turbine powerplants by permitting operations at temperatures of 1800° F and higher.

Also brought to the attention of the assembled engineers was the assertion by physicists from the Applied Physics Laboratory, Johns Hopkins University, Silver Springs, Md., that for sustained propulsion at supersonic speeds, no other engine can compete with the ram-jet. Outstanding characteristics of this engine are its high power per unit frontal area and per unit weight, its high impulse as compared to rockets, as well as its mechanical simplicity.

The ram-jet engine, it was explained, produces 25 hp per lb of weight as against 12 hp per lb for the rocket and 1 hp per lb for the internal combustion engine. Fuel consumption is nearly five times the internal combustion engine but only one sixth that of the rocket.

The new low pressure tires that are becoming increasingly popular, according to G. H. Parker and Edgar Shay, engineers of the Chrysler Corp., have the following advantages: Increased cushioning of the ride, reduced body shake, improved "cornering" on rough roads, lower roll and better fuel economy, less road noise and longer normal life. Disadvantages listed were increased steering and parking effort, increased "squeal," blanketing of brakes and increase in tire and wheel weight.

Progress in auto paints has been significant, according to M. G. Belland and W. W. Bauer of Pittsburgh Plate Glass Co. The permanence of color-fastness of pastel shades of green and blue has been increased remarkably in recent years and the selection of proper pigments and vehicles as well as proper combining of undercoatings and finishing coats into a balanced system of protection has done much to protect against corrosion of metals.

In automotive lacquer, for example, scientists have been able to increase the solid content at the guns, thus enabling fewer coats to give standard film thickness. Gloss retention, it was pointed

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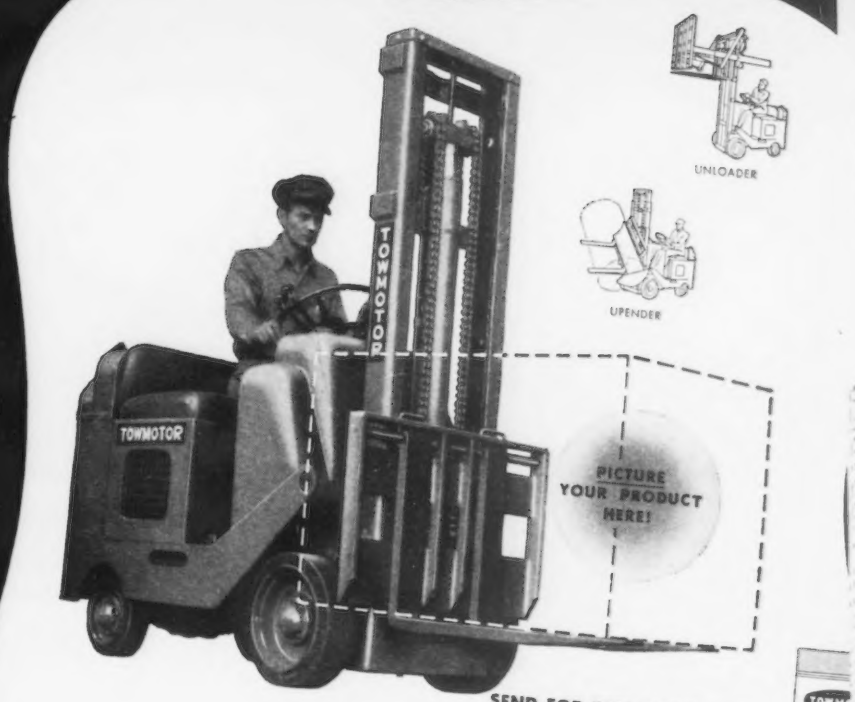

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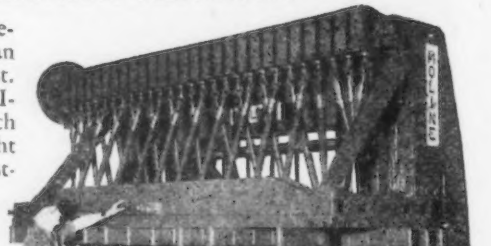

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out, is approximately ten times the rate prevailing in 1936. There has also been a substantial improvement in resistance to chalking.

Automotive synthetic enamels show much greater latitude of workability, and marked improvement in resistance to chalking. Today's synthetic enamels may be considered to be ten times as hard as those produced 10 years ago.

Walter E. Jominy, staff engineer, Chrysler Corp., added his voice to the growing volume of opinion in the industry that there is not much difference in the engineering properties of alloy steels as long as they are properly heat treated.

To minimize distortion, Mr. Jominy recommends quenching most parts in oil, in which case the amount of hardenability to harden the part in oil determines the "minimum acceptable hardenability that the steel may have." If distortion is not a problem, he said, enough hardenability to harden in water is all that is required.

Mr. Jominy suggested that there should be not less than 90 pct martensite in the outer layer of any portion of a part stressed in bending or torsion. For some shapes this layer need be no greater than one fourth the radius. Parts like bolts, however, which are stressed mainly in tension, require 90 pct martensite at the center.

Other subjects discussed at the 1948 convention included replacement of vehicles, uses of low alloy high tensile steels, the light car, tractor transmission gears, aircraft engine fuel injectors and air transport design.

R. J. S. Pigott, chief engineer of Gulf Research & Development Corp., Pittsburgh, was introduced as the 1948 president of SAE, succeeding C. E. Frudden. Allis-Chalmers Mfg. Co., Milwaukee.

Jessop President Resigns

Washington

• • • **Fred T. H. Youngman** resigned Jan. 19 as president of Jessop Steel Co., according to reliable sources. Mr. Youngman gave ill health as his reason for resigning the post he had held since 1945. Company officials could not be reached for comment. Mr. Youngman joined Jessop in 1919.

Basing Point System Subject of Argument To Reverse FTC Order

Chicago

• • • **In Chicago** the question of legality of the so-called basing point system of determining prices was recently argued before the Seventh Circuit Court of Appeals by the conduit makers who are seeking a reversal of the cease and desist FTC order. For the first time the isue of legality of this pricing method reached an upper court without the related charges of combination or conspiracy prohibited by the Sherman Anti Trust Act or price discrimination barred by the Robinson-Patman Act. The case is now under consideration with the testimony complete and there are indications that the court may await the Federal Supreme Court's ruling in the cement case before handing down a decision on conduit.

The question to be settled is whether heavy goods industries must change their practices and sell only on a uniform f.o.b. mill basis, or whether they can continue to use the basing point system. The case argued before the court here involved an appeal by the rigid steel conduit industry from a cease and desist order of the Federal Trade Commission. The commission had ruled that the basing point system in industry is an unfair method of competition that has been declared unlawful by the trade commission act.

The conduit makers in their attack on the order asserted that the commission is asking the court to outlaw the basing point system after congress on four different occasions refused to enact legislation outlawing the practice. In essence, the commission is seeking to require manufacturers to stop selling on a basing point delivered price where reductions are effected to meet competition. Oral argument heard by the circuit court in five consolidated appeals brought by manufacturers include such companies as General Electric, Republic Steel Corp., and Youngstown Sheet & Tube.

Thurlow M. Gordon, counsel for General Electric Co., before the United States Circuit Court of Appeals here declared "that a freight rate wall" will be erected half way between Schenectady and New

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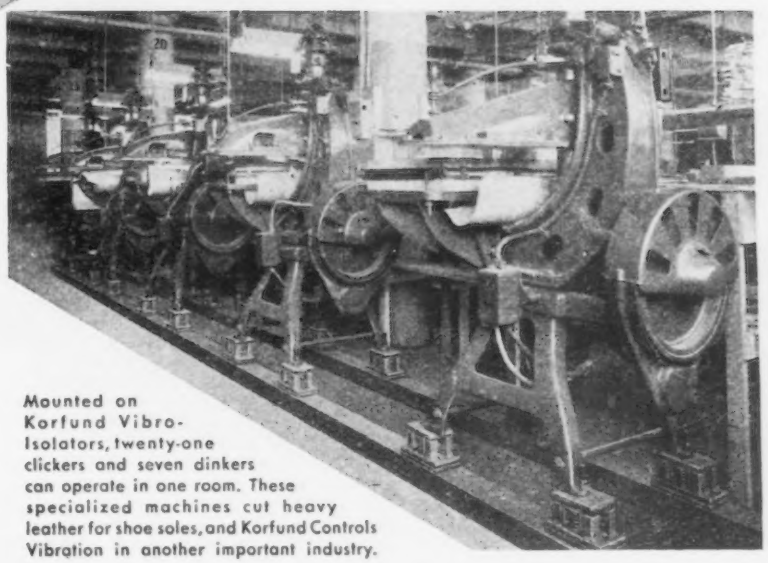

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York and Pittsburgh if the FTC is successful in outlawing the right of a manufacturer to absorb freight charges to enter a market where he has a competitive disadvantage. "If the commission succeeds in sustaining the principle of the law embodied in this order, a freight rate wall will be created roughly half way between Pittsburgh and Schenectady," Mr. Gordon told the court. He continued, "General Electric will be unable to sell south and west of that wall, Westinghouse will be unable to sell north and east of that wall. General Electric can no longer sell here in Chicago and Westinghouse will have to retire from New York."

The counsel pointed out that his company cannot put its factories on wheels. "It has to put its product on wheels and it has to sell at prices flexible enough to meet competitive conditions as they exist in different markets." The counsellor declared, "The commission says it cannot do so—even acting individually without collusion—that even individual freight absorption is illegal per se."

This case, therefore, presents a question of the greatest importance to the country generally, "Whether we are to abandon the ideal of free trade within a national economy or whether we are to Balkanize the United States into a series of local monopolies, each bounded by an impassible freight rate barrier," the General Electric attorney said. The case was heard by Judges William M. Sparks, Otto Kerner and Sherman Minton, who now have the case under advisement.

Set Tubing Standards

Washington

• • • **The National Bureau** of Standards is sending to producers, distributors and users a proposed simplified practice recommendation on copper and copper alloy round seamless tubing developed in cooperation with the Copper & Brass Research Assn. The purpose of the proposal is to limit the number of sizes of such tubing in general commercial use so as to reduce tube mill production costs and permit building stocks of the more generally useful sizes. The proposal does not apply to copper and brass pipe, copper water tube, automotive and refrigeration service tube, or to heat exchanger tube.

Weekly Gallup Polls

(CONTINUED FROM PAGE 123)

shape up in the five major geographical sections of the country:

Truman-Dewey-Wallace

	Truman Pct	Dewey Pct	Wall. Pct	No op. Pct
N. Eng. & M. Atl...	41	45	9	5
E. Cent.	36	49	6	9
W. Cent.	45	44	5	6
South	75	19	1	5
Far West	46	38	8	8
National	46	41	7	6

Truman-Taft-Wallace

	Truman Pct	Taft Pct	Wall. Pct	No op. Pct
N. Eng. & M. Atl...	45	33	11	11
E. Cent.	42	35	8	15
W. Cent.	45	38	5	12
South	76	16	2	6
Far West	49	28	10	13
National	51	31	8	10

The figures apply to sections as a whole, not to any one individual state within a section.

One interesting sidelight in the institute's current polling is the candidate preference of veterans of World War II.

The veteran vote follows:

VETERANS

	Pct
Truman	45
Dewey	42
Wallace	9
No opinion	4

★ ★ ★

Truman	54
Taft	29
Wallace	10
No opinion	7

In its series of reports on the political situation, the institute has shown the following:

(1) Truman leads Dewey and Taft in national popularity in the institute's trial heats.

(2) Outside the South, however, Dewey runs ahead of Truman.

(3) Labor union members polled indicate a preference for Truman over either Dewey or Taft.

(4) Farmers outside the South show comparatively little enthusiasm for Truman. They express a preference for Taft over Truman, as well as for Dewey over Truman. With the farmers of the South added in, however, Truman leads in total farm vote.

(5) The Wallace candidacy creates a real hazard for the Democrats in carrying New York State. A poll of that state finds Wallace splitting the Democratic vote to a sufficient extent to put Dewey ahead of Truman in the trial heat.

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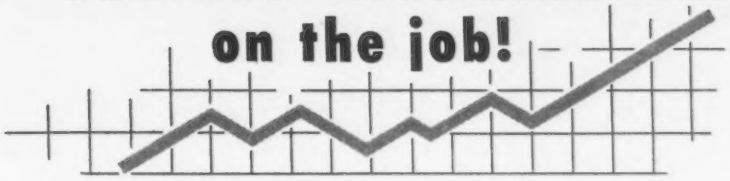

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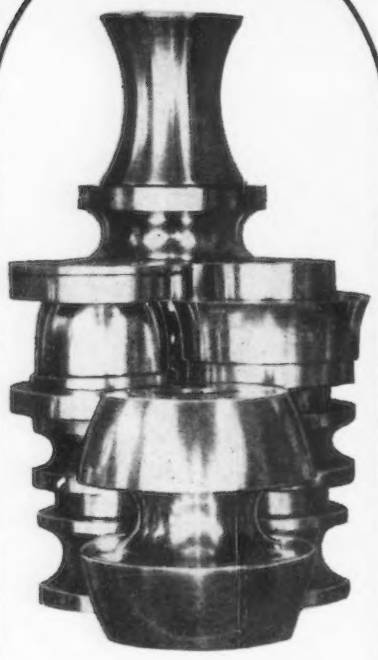

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ARDCOR

Declares Steel Prices And Profits Are Low, But Costs Are Higher

Waukegan, Ill.

Steel prices are still low, Clifford F. Hood, president, American Steel & Wire Co., told the Waukegan-North Chicago Chamber of Commerce at its annual meeting in Abbott Auditorium, North Chicago.

"Perhaps you noticed an advertisement of the Pennsylvania Railroad recently which reported that the railroads today are paying 171 pct more than in 1939 for forestry products, 81 pct more for fuel, 75 pct more for wages and wage taxes, but only 47 pct more for iron and steel products," he pointed out.

"I do not know about the purchases of the railroads, but the composite price of steel as published by THE IRON AGE shows an increase of only 39 pct since 1939."

THE IRON AGE steel price composite is constructed from the base prices of finished steel products. It does not reflect extra charges (specific charges for certain chemical and physical characteristics added to the base price) which all consumers pay in varying amounts.—Editor.

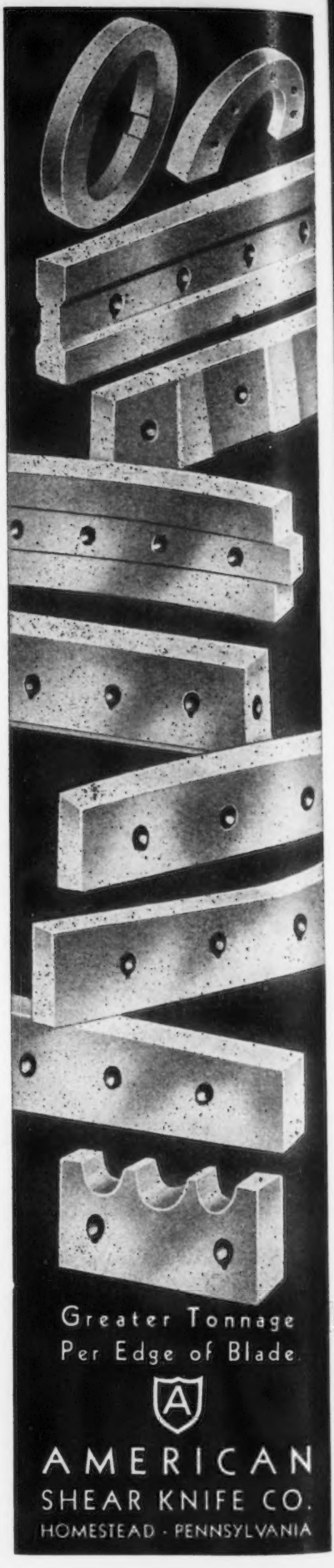
Mr. Hood said that while government figures show that the average wholesale prices of all commodities today are about 110 pct above 1939, the current price of steel at the mills is about 39 pct higher.

"If steel prices had gone up as much as other commodity prices, the pound of steel which today sells at the mill for just over 3¢ a lb would be selling for nearly 5¢," he asserted.

He said increased costs have created a serious problem for the steel industry in the matter of replacements of equipment. Most steel producing facilities which were installed 10 or 20 years ago now cost several times as much to replace as the original cost.

"This means that depreciation reserves at normal rates are inadequate to meet current requirements."

Mr. Hood said a company which installed a $1 million producing unit 15 years ago may have set up



a depreciation of about $66,000 annually for 15 years.

"If replacement today costs $3.5 or $4 million dollars, and the fact of the matter is that new facilities cost up to three and one-half times as much as in 1929—the company must raise new capital or make up the difference out of profits. This is a serious drain on earnings.

Mr. Hood cited public opinion surveys indicating widespread misinformation about the amount of money that steel companies earn.

"Almost one-third of the people think—and quite wrongly—that the steel industry led all others in making large profits during the war. Equally wrong is the public impression that year-in-and-year-out the steel industry outranks almost every other industry in making 'big money.'

"From 1942 to 1946 the steel industry's profits on sales averaged 3.5 pct. In the same five years, the earnings of the industry averaged 5.3 pct on capital investment. In 1946 profits after taxes of representative steel companies averaged 5.5¢ on the sales dollar," he pointed out.

He said the steel industry's profit on invested capital is low by comparison with other industries. The average in other industries for 1946 was 12 pct on investment, almost double the average return reported by steel companies.

"Comparable figures are not yet available for 1947, but unquestionably the industry will report profits considerably higher than in 1946. Not only was production greater, but also various forces which tend to inflate the volume of profits were more evident in 1947 than the year before. But actually the buying power of the industry's profits in 1947 was much lower than the profits reported for many earlier years when the total number of dollars earned was less than in 1947."

Quarry Site Purchased

Washington

• • • **Sale of the** dolomite quarry site of the surplus Amco Magnesium Corp. plant at Wingdale, N. Y., to the D. H. Litter Co., Inc., of New York has been approved by WAA. Purchase price of the million-dollar quarry and facilities was $275,000.

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Compare this control method with the older method of specifying only the *operation* (i.e., the machine, wheel or tool, speed, feed, etc.). A test in your own plant will show you that on *any* operation from cutting to polishing, the roughness will vary from 200% to 400% or more between identical machine set-ups, and from hour to hour on any one machine. With the positive-reading Profilometer at hand, your operators can catch these deviations at the start, and can maintain the required finish by making appropriate machine adjustments. This *positive control* gives greater production economy every time.

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Canada's Steel Program Will Be Clarified With Import Control Advent

Toronto

• • • **The import control** on structural steel which goes into effect Feb. 1, 1948, is not expected to result in any sharp curtailment of imports from the United States in so far as shapes are concerned, but the new order may cut sharply imports of other iron and steel items from across the line, according to information obtained from reliable sources. If more structural steel can be obtained this year than last, Canada hopes to obtain it from the United States. Actually, Canada expects to make use of her import control plan to conserve "end use" of steel rather than to restrict tonnage imports.

It is further stated that instead of placing it on the various government departments, the onus for rationing of structural shapes will be put in the hands of Canada's 25 major fabricators. What is planned is to permit fabricators to import as much steel from the U. S. as they can, and make the distributors responsible for its sale only to holders of government permits. Actually this means that fabricators will be placed in the position of handling end control on a voluntary basis.

Within the next two weeks Canada's 1948 steel program is expected to be clarified. Discussions are to take place with high government officials as well as with U. S. interests, and out of these discussions is expected to materialize a fairly accurate picture of what can be expected with regard to importation as well as domestic production. As formerly announced, Canada has been placed on about the same basis as American purchasers of U. S. steel.

Net Income Doubled

Chicago

• • • **In the annual** report to stockholders issued for the fiscal year ended Oct. 31, 1947, Foote Bros. Gear and Machine Corp. reports net income of $428,860 after all charges and after provision for federal income taxes. This is an increase of more than 50 pct over net income of $278,353 for the previous fiscal year.

November Output For Ingots and Casting

Toronto

• • • **Canada's production** of steel ingots and casting for November amounted to 255,372 net tons, which was 86.3 pct of total capacity, and compares with 256,461 tons or 86.7 pct for October and with 222,644 tons in November 1946. Output for the month under review included 246,785 tons of steel ingots and 8587 tons of steel castings.

Charges to steel furnaces in November included 138,381 tons of pig iron; 76,666 tons of scrap of consumers' own make and 62,357 tons of purchased scrap.

For the 11 months ended Nov. 30, 1947, cumulative production of steel ingots and castings totaled 2,695,397 net tons, and compares with 2,097,331 tons for the 1946 period and 2,662,042 tons for 1945.

Following are comparative monthly production figures of steel ingots and castings for 1947 in net tons:

	Steel Ingots	*Steel Castings*
January	243,557	6,241
February	223,124	6,098
March	263,193	6,539
April	244,998	7,158
May	235,978	8,098
June	230,581	7,716
July	226,443	5,898
August	226,180	7,574
September	225,457	8,731
October	247,171	9,290
November	246,785	8,587
Total 11 Months	2,613,467	81,930

Urges Standard Terms For Bolts, Nuts, Screws

Cleveland

• • • **Standardization of** terminology and abbreviation for designating bolts, nuts, screws, rivets and other related products in the fastener industry is advocated in a recent compilation published in "Fasteners," the official publication of the American Institute of Bolt, Nut & Rivet Manufacturers, Cleveland.

A 4-page brochure, reprinted from "Fasteners," Vol. 4, No. 2, gives recommended abbreviations for the various types of fasteners and points out that both producers and buyers of threaded products will benefit through the adoption of a standard system of terminology and abbreviations for use on

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drawings, orders, invoices, stock lists and other records. This standardized version of terminology compiled jointly by producers should render the task of both manufacturer and user infinitely easier in all phases of correspondence.

One manufacturer found that use of his own individual system of fastener abbreviation and terminology resulted in three times the normal output of the company's order department.

Producers feel that a common set of abbreviations and standard phraseology throughout the industry will bring about an enormous saving in time and money by facilitating readily understandable records and expediting ordering, shipping and billing operations.

Simplified Practice For Rotary Files And Burs Is Developed

Washington

• • • **A proposed simplified** practice recommendation for rotary files and burs has been developed by the National Bureau of Standards in cooperation with the Rotary File and Bur Institute and submitted to manufacturers, distributors and users of these products for approval.

The adoption of the new simplified practices is expected to benefit the producer, distributor and the consumer. It will result in less capital tied up in slow moving stocks, prompter delivery, less obsolete material and equipment, increased turnover, quicker selling items, better values, better delivery and repair service, and better quality of product.

The Bureau recommends stock shapes, sizes and other dimensional data for rotary files and burs, and the program includes recommended numbers of teeth per inch. Files and burs having shank diameters less than 0.25 in. are not covered.

The recommendations include specifications on materials to be used, shank sizes, and number of teeth per inch on course, standard, and fine rotary files and burs.

England to Continue Steel Exports Despite Short Home Supply

London

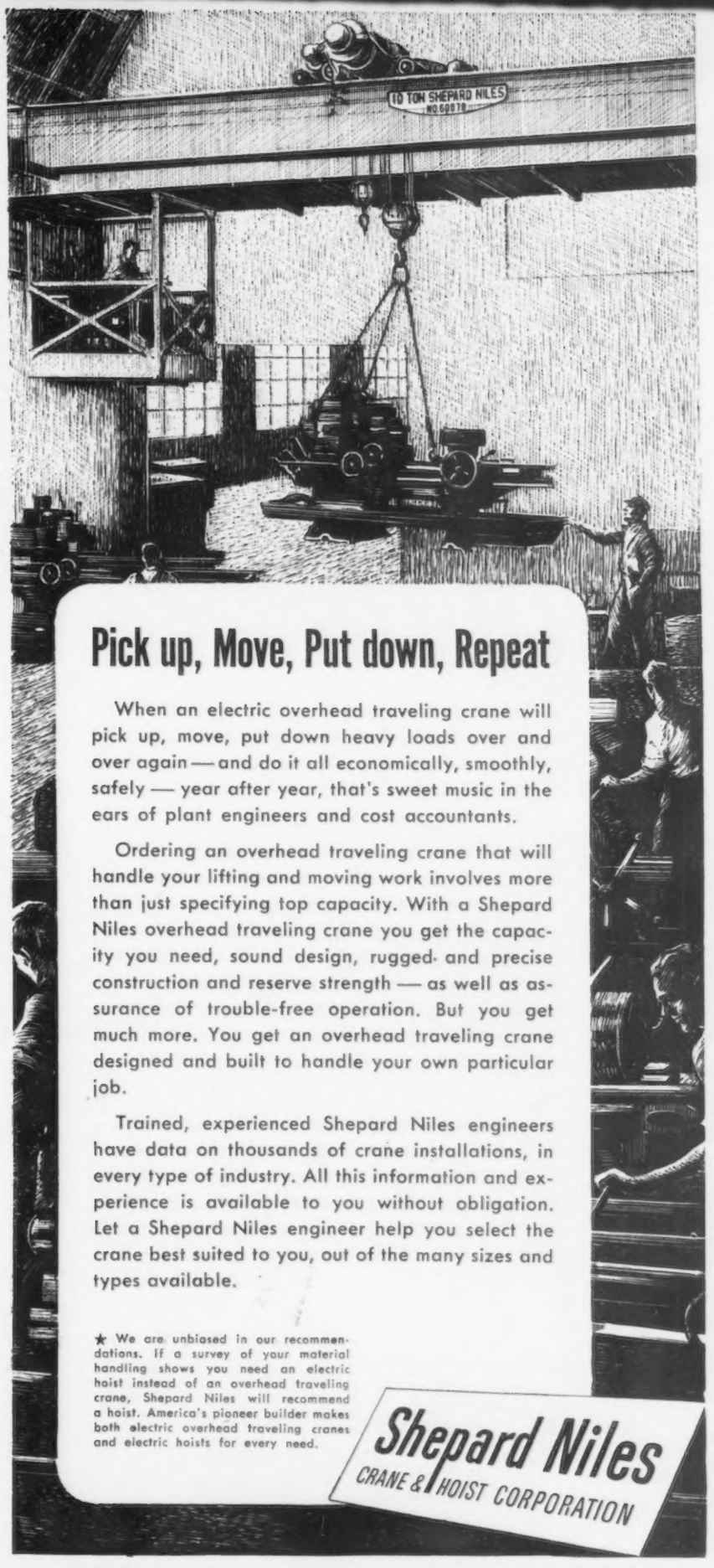
• • • **Britain will be** short of at least a million tons of finished steel in 1948, according to Sir Stafford Cripps, Chancellor of the Exchequer. It nevertheless expects to ship a million tons abroad during the 12 months.

The Chancellor explained the apparent paradox by saying that steel exports are essential in order to pay for the food and raw materials that Britain must import. It was not merely a matter of needing to earn the foreign exchange represented by a million tons of steel; it was more serious than that. "In many of the bilateral trade negotiations which we must conclude, there are many instances in which we could not get negotiations on their feet unless we could offer other countries some quantity of steel or steel goods.

Other countries, suffering like ourselves from a shortage of foreign exchange and from inconvertibility are highly selective in the imports that they will take," said Sir Stafford Cripps. "They therefore tend to concentrate largely upon capital goods of all sorts and these all require steel. We must use some of our steel to satisfy these demands. It is natural that other countries should expect us, as one of the highly industrialized countries, to play our part in world reconstruction and in making good the ravages of war, it is in our own long-term interest to do so."

Remarking that any failure to reach the production target of 14 million long tons of ingots and castings would have most serious consequences, Sir Stafford Cripps described as permanent the expansion in the use of steel for various key purposes and in the extent of the British engineering industry as a whole. He was outlining the position in a talk to newspapermen.

Before the war, production of railroad cars was around 30,000 a year — principally timber-bodied cars. The 1948 production program is 48,000 all-steel cars, each one using 6 tons more steel than a car with a timber body. In the mines the new program of re-equipment plus the steadily expanding use of steel for supports means a great increase in the use of steel for un-



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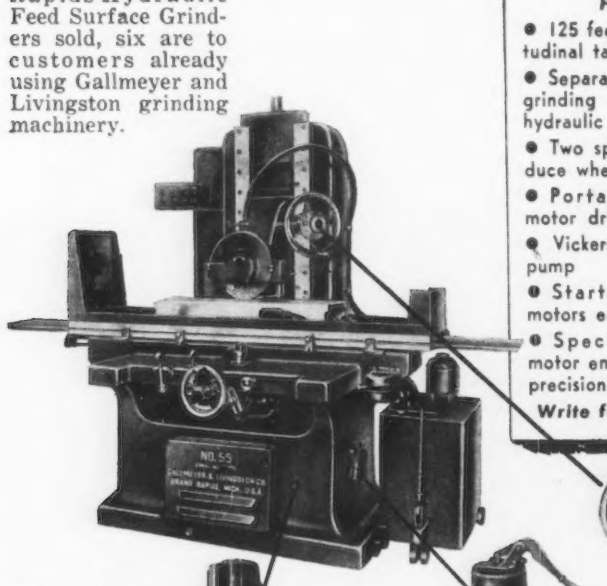

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derground work. For this purpose steel consumption rose from 32,000 tons per quarter in 1942 to 56,000 tons per quarter in 1947, and the estimate for 1948 is 65,000 tons per quarter.

A great deal of extra steel is required for the manufacture of machinery and vehicles of every kind, where output is running far above pre-war levels. Much of this is for export. In reaching overall export targets, the machinery and electrical industries are carrying a large share of the burden and must continue to do so. In terms of money machinery is earning over three times as much foreign exchange and electrical goods and apparatus nearly four times what they earned in 1938. Together they accounted for one-fifth of all British exports in the first eleven months of 1947, compared with one-seventh over the same period of 1938.

There is a heavy program of farm machinery production for home agriculture, and under the European Recovery Program there will be contributions of farm equipment and other finished products requiring iron and steel. The development of British colonial resources requires steel, for agricultural machinery, railways, harbors and other capital equipment, including industrial buildings and plant.

According to the Chancellor, all this means that in 1948 Britain could use for essential purposes alone 11½ million long tons of finished steel, a figure which compares with an estimated availability of 10½ million long tons. The country will, in fact, be short of at least one million tons of finished steel or just over 1⅓ million tons of ingot steel in 1948.

The extent to which the United Kingdom will be able to supplement home production by imports during 1948 and afterwards is subject to a number of factors, such as the outcome of bilateral negotiations and of the Marshall Plan, but apparently the government is assuming at the moment that it may be able to import something over 500,000 tons of ingot steel in 1948.

Sir Stafford stressed, however, that this must be regarded as merely an approximate estimate. "What seems clear is that we shall be unable to import as much steel as we could effectively use, and this for a number of reasons. The U. S. A. itself is short of steel, even with its vast productive capacity,

and the amount available for export is extremely limited. This is shown by the tentative list of goods available for export from the U. S. A. under the Marshall Plan which has been published by the U. S. A. administration. Under it we should receive only about 400,000 tons a year as against an estimated need of 2¼ millions.

"This would, of course, affect our capacity to export steel goods to help other European countries in their reconstruction. We are suffering, in part, from the fact that during six years of war new development in our steel industry was almost at a standstill. Not only was there no expansion, except in a few special fields, but most major replacements and repairs had to be postponed."

The Chancellor attempted some indication of which industries are likely to benefit from the increase in supplies over 1947. The Ministry of Supply, which sponsors the engineering and vehicles industries, will be allocated rather more than the 1947 deliveries, while for consumer goods the Board of Trade will get a little above last year. The agricultural machinery manufacturers will receive a very substantial increase. The Ministry of Transport will receive an important addition to its 1947 figure. An increase will be made in the direct allocation to the coal mines, and for the program for new power station capacity, the electricity industry also may receive a substantial increase.

These additions exceed the expected increase in supplies. Certain adjustments will accordingly be necessary on the other side of the scale. The greatest of these will be a 40 pct cut for factory and government building. The other most notable reduction will be in the allocation to the shipbuilding industry, and will be something approaching one-fifth of the 1947 deliveries. The gas industry also will suffer, receiving a little less than last year.

Sir Stafford Cripps thought that the prospects for coke and scrap have both improved over recent weeks, though not so much as to remove the need for anxiety. Improved output from the mines justifies the hope that enough coking coal will become available to supply the coke that is needed.

The return of scrap has also been accelerated since the recent

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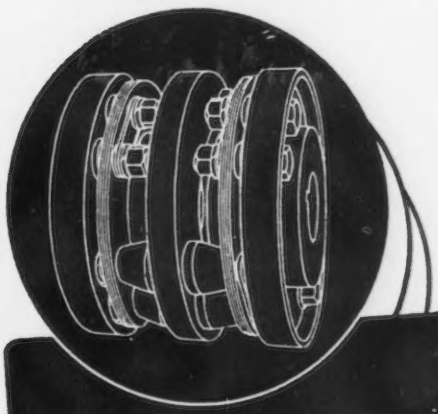

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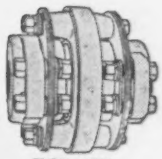
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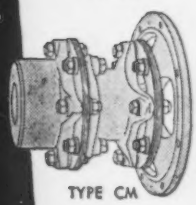
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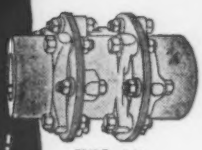
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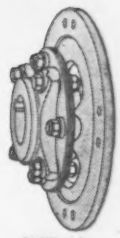
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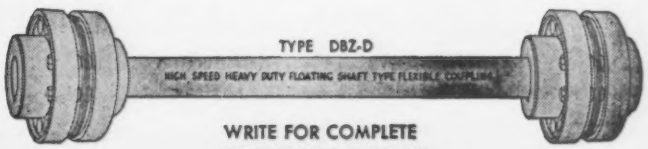

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appeal made by the industry, and deliveries to steel works are now running at 10 pct higher levels than a year ago. Domestic supplies are, however, limited, many warlike stores do not provide suitable scrap, and the collection of household scrap involves disproportionate difficulties. The Chancellor, therefore, looks to overseas scrap sources for the balance of about a million tons which is the estimated requirement if all home sources are fully tapped and blast furnaces produce their maximum output of pig iron.

He recognizes that the U. S. industry, which was one of Britain's main prewar sources, has no surplus of scrap available for export. He considers, however, that there are ample supplies of scrap available in Germany, both to satisfy the German steel industry and leave substantial quantities free for export.

Concluding his survey of the position, Sir Stafford Cripps said that the urgency of Britain's present needs must not be allowed to obscure the vital importance of the long-term expansion program on which the iron and steel industry was engaged. The plan prepared by the industry whereby a series of projects to modernize and expand were to be initiated over a period of years starting in 1946 for completion in about 7½ years (the plan was developed as a 5-year program), catered during that period for an increase of ingot steel production of about one-seventh and within that increase for replacement of old by modern plant of approximately two-seventh. Already considerably more than half of the plan had been approved in detail by the Iron and Steel Board, involving an expenditure at current prices of nearly $500,000,000. In addition, about another one-sixth had been approved in principle to be undertaken in its proper order.

The expansion program, as originally drawn up, has been studied, section by section by the government control board since it was appointed. Now, since the government has decided to cut down on capital expenditures, the whole thing is again being hashed over to see if any painless chopping can be done.

Annual Report Shows Lukens Net Sales Set New Peacetime Record

Coatesville, Pa.

• • • **Lukens Steel Co.** and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc, reported for 1947 net sales of $52,773,066, the highest peacetime level in the company's history, and a net income of $2,835,701, amounting to 5.4 pct of sales.

Lukens spent $3,219,875 in expansion and improvement projects. Among the improvements the annual report cites a new sodium hydride descaling plant for the removal of metallic oxide scale in the production of clad and alloy steels and specialties; a new flanging machine to enable Lukens to spin the largest diameter heads available for tanks and pressure vessels; and an additional plant for Lukenweld which added 217,000 sq ft of floor area.

The 1947 fiscal year marked the end of the corporate eixstence of Lukens' two wholly-owned subsidiaries, By-Products Steel Corp. and Lukenweld, Inc. Both will be continued as divisions of Lukens, under the names By-Products Steel Co. and Lukenweld.

Hudson Buys Buildings

Detroit

• • • **Hudson Motor Car Co.** has confirmed the purchase of approximately 200,000 sq ft of factory space from the Fruehauf Trailer Co. The new factory building is adjacent to Hudson's Gratiot Ave. plant.

A total of six buildings is included in the new Hudson facilities. The largest of these contains 132,000 sq ft of floor space. It is expected that the new facilities will be used for steel shearing operations, storage and manufacture of small parts.

The property is located on Harper between the DTRR tracks and French Road. It will be known as the Harper plant of the Hudson Motor Car Co. and is immediately adjacent to Hudson's body plant.

Safe on any surface

There's one metal cleaner that just doesn't fall down on the job. That's Wyandotte Metal Cleaner No. 38. This *balanced* product can solve practically all the cleaning needs of the average plant with economy and efficiency.

Wyandotte Metal Cleaner No. 38 is all-soluble. It dissolves quickly, rinses easily and completely. It is designed to correct water conditions . . . wet rapidly . . . give long life in solution. It is inhibited to prevent corrosion of the metal being treated.

Wyandotte Metal Cleaner No. 38 is being used successfully for electro-cleaning of ferrous metals, as well as copper and brass. It is a proven reverse current cleaner for zinc-base die-castings. It is giving satisfaction when used in electro-cleaning baths on hand-operated, semi- and full-automatic line . . . in still-cleaning solutions . . . in tumble barrel equipment . . . in pressure spray and rotary type metal parts washing machines.

Let your Wyandotte Representative tell you more about the advantages of Wyandotte Metal Cleaner No. 38. He's always at your service.

WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN • Service Representatives in 88 Cities

Wyandotte
REG. U. S. PAT. OFF.

MACHINE TOOLS

. . . News and Market Activities

Impending Price Increases Smoking Out New Machine Tool Orders

• • • **Price increases** are still smoking out new firm orders and indications are that the strong machine tool market in January will carry over well into February, according to reliable sources in the trade.

Business volume during the past 8 weeks has been high enough to rekindle much of the optimism which preceded the Machine Tool Show, and some executives believe that prospects for the next 5 months leave nothing to fear.

In Detroit most segments of the machine tool industry report that the volume of business is continuing at levels considerably higher than November and December. Inquiries are piling up on the desks of some suppliers as machine tool buyers appear to be moving more cautiously and demanding increased numbers of quotations for new equipment.

An encouraging factor in the present picture is the substantial volume of inquiries being received from small shops.

Tool and die makers in Detroit report their shops are well filled with Ford and Chrysler work at the present time, although new GM die programs appear to be quiet at the moment.

A considerable amount of activity is reported on behalf of Kaiser-Frazer, which is believed to have a new engine program under consideration either for Willow Run or its Detroit unit. Some requests for quotations have recently been received from GM truck and coach and a substantial machine tool program for Reo at Lansing is said to be active at the present time. Indications are that the new tooling program for Dodge will be accelerated during the next few months with some type of equipment being tentatively scheduled for delivery by midsummer.

Producers of specialized equipment here have been notified that in the future electric motors will be sold on the basis of escalator clauses calling for price at time of delivery with "increases not to exceed 20 pct." Some machine tool builders have interpreted this recent move, price jumps to 20 pct may confidently be expected in the future for these items. This notice has been received, it is reported, at a time when close buying by large automotive plants has been receiving increased attention.

Many Observers Believe Strong Market in January Will Carry to February

° ° °

A Detroit supplier of specialized equipment indicates that most machine tool builders in this area are operating with substantial backlogs on hand. Requests for new quotations for most lines, it is reported, are in good volume and with reasonable success in landing new orders, most plants in Detroit area should be reasonably busy for the next several months.

Directors of National Tool & Die Manufacturers' Assn. met in Washington last week to discuss problems of the industry with administration officials and members of Congress.

At a conference with Commerce Dept. officials, including Under-Secretary William C. Foster and J. L. Kelley, director, Office of Small Business, W. R. White, Jr., NTDMA president, and a member of the Small Business Advisory Committee to the Secretary of Commerce, it was urged that as much protection as possible be given to the smaller manufacturers on their steel supply.

Mr. White said that most of these firms are in the less essential lines and would be seriously crippled if they receive less steel than the inadequate amounts most are now getting.

He pointed out that many tool and die shops obtain tooling business from these smaller manufacturers and frequently make metal specialties of their own.

In a round-table discussion which followed, it was brought out that the industries getting more steel for the urgent programs will be asked to take less for other uses. Commerce Dept. plans to give interested groups a hearing at which any anticipated disproportionate handships can be brought to their attention, for such relief as may be possible.

Other problems of the contract tool and die shops informally discussed were depreciation allowances, undistributed profits tax, working capital needs, and pressure from unions for uniform wage patterns. Arrangements were made to submit a further statement of the industry's problems.

At the Directors meeting reports from some centers regarding the business outlook were quite encouraging, and from others, only fair. Stamping dies and special machinery are the types of special tooling most in demand. Little change in employment in the tool shops was reported.

Next meeting of the NTDMA board will be held at the Lincoln Hotel, Indianapolis, May 21-22.

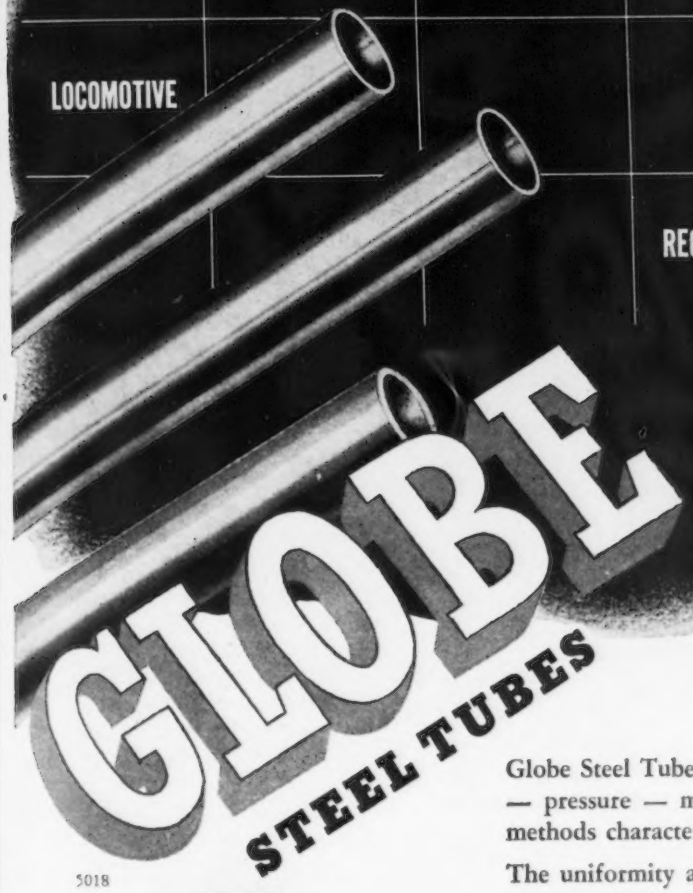
* * *

• • • **WAA has revised** its policy which heretofore required that machine tools released by JANMAT at request of industry be reoffered through priority channels. Equipment previously offered to priority and nonpriority purchasers and released by JANMAT through Feb. 14 will be offered the requesting party at the established fixed price, subject to 17½ pct discount.

Those previously offered but released after Feb. 14 will not be subject to the discount, those not offered previously will be put on sale in the usual way to priority and nonpriority purchasers.

No Matter what Class or Type of Steel Tubing you need--

CARBON	STAINLESS WELDED (Gloweld)	HIGH DUCTILITY	HIGH TEMPERATURE SERVICE	CORROSION RESISTANT	AIRCRAFT
HIGH MAGNETIC PERMEABILITY	ALLOY	HIGH PURITY IRON (Globeiron)	STRUCTURAL	PRESSURE	SPECIAL ANALYSES
AUTOMOTIVE	POLISHED	STAINLESS SEAMLESS	COLD DRAWN	CONDENSER AND HEAT EXCHANGER	SPECIAL SHAPES AND FORMS
LOCOMOTIVE			TOUGH	ANNEALED	MECHANICAL
			RECTANGULAR	ROUND	SQUARE



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Globe Steel Tubes Co. specializes in the manufacture of steel tubes — pressure — mechanical — stainless. Advanced machinery and methods characterize all mill operations.

The uniformity and quality of Globe Steel Tubes is controlled by constant checks and tests in the Globe Laboratories, equipped with complete facilities for chemical, physical and microscopic analyses.

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GLOBE STEEL TUBES CO. MILWAUKEE 4, WISCONSIN, U.S.A.

NONFERROUS METALS

. . . News and Market Activities

Copper

• • • **Producers will** open up March books this week. There are indications that the copper demand for March will be just as heavy as requirements so far this year. There is no evidence of declining demand on the part of wire mills or brass mills. However there are reports from some parts of the country that more active selling efforts are being applied to brass mill products where quotas are not being fully taken up.

Brass mills report that they have a 60-day backlog of business on hand for most products. At the present time there is an ample supply of brass rod and pipe in mill and warehouse stocks. But orders are reported to be coming in at a rate sufficient to permit two shifts full time and a partial third shift to balance out the order schedule. Some brass mill officials have reported that at the low profit margin of the industry it is necessary to operate on a full three shift basis. American Brass Co. has announced price increases on some brass products effective Jan. 30.

•

Lead Production Rises

Toronto

• • • **Canadian production** of lead in November amounted to 14,651 tons compared with 12,787 tons in October and 11,229 tons in November 1946. For the 11 months ending with November, lead output totaled 148,109 tons against 163,838 tons in the 1946 period.

Production of zinc in November amounted to 18,735 tons compared with 18,611 tons in October and 18,357 tons in November 1946. For the first 11 months of 1947, production of zinc totaled 194,552 tons, down from the 216,923 tons in the like period of 1946.

•

Lead

• • • **Demand for lead** continues in excess of available supplies but producers have already detected a seasonal decline in the requirements of the battery manufacturers. All other consumers are maintaining their high rate of demand but the relief afforded by battery makers will permit distribution of some additional lead in February and March. The price of lead is unchanged.

•

Raise Brass Mill Scrap

New York

• • • **Ingot producers** are reported to be all but out of the market for copper and brass scrap. Any buying being done is at prices ¾¢ below the previous market. One brass mill has increased its scrap allowance by ½¢ per lb on some grades effective Jan. 30. Its allowance on copper is 19.125¢, yellow brass 15.625¢, yellow brass turnings 14.75¢. The $20 per ton quantity premium previously offered for shipments of 40,000 lb or more is now offered for shipments of 15,000 lb.

•

Canada Raises Tin Price

Ottawa

• • • **Wartime Prices** and Trade Board announced an increase in the Canadian ceiling price for tin of 16¢ per lb to bring the new ceiling to the world price level of 96¢. The new price went into effect Jan. 28.

Monthly Average Prices

• • • **The average prices** of the major nonferrous metals in January based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	21.50
Lake copper, Conn. Valley	21.625
Straits tin, New York	94.00
Zinc, East St. Louis	11.077
Zinc, New York	11.687
Lead, St. Louis	14.80
Lead, New York	15.00

Producers to Take Up Subsidies at Denver

New York

• • • **The interest** of the mining industry was centered last week on the forthcoming meeting of the Colorado Mining Assn. to be held in Denver this week. Members of a subcommittee active in subsidy legislation of the Senate Public Lands Committee are to be present. Under pressure of rising costs, some mining interests are set to bring up the subject of minerals subsidies. It is the experience of some high cost copper producers that their costs have risen to the point that there is little profit at the current copper price.

Minerals development and marginal production were subjects to be studied by the Krug Minerals Advisory Committee. So far there have been no meetings of the nonferrous metals subcommittees, and current inquiry reveals no prospect for early action along these lines. It is probable that action by these committees would require more active leadership by Interior Department officials. Reports from the trade indicate that political pressure from coal mining areas is presently being applied to prevent the confirmation of James Boyd as director of the Bureau of Mines and to weaken the position of Secretary Krug.

In some quarters there is the feeling that with the increase in the price of zinc, the need for minerals subsidies ended.

Nonferrous Metals Prices

Cents per pound

	Jan. 28	Jan. 29	Jan. 30	Jan. 31	Feb. 2	Feb. 3
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	94.00	94.00	94.00	94.00	94.00	94.00
Zinc, East St. Louis	12.00	12.00	12.00	12.00	12.00	12.00
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point, freight allowed	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be.	$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be.	$40.00
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$80 to $90
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$80 to $82
Nickel, electro, f.o.b. New York	36.56¢
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$66 to $69
Silver, New York, cents per oz.	74.625
Tin, Grade A, New York	94.00
Zinc, East St. Louis	12.00
Zinc, New York	12.61
Zirconium copper, 6 pct Zr, per lb contained Zr.	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	19.75-20.50
No. 120	19.25-20.00
No. 123	18.75-19.50
80-10-10 ingot	
No. 305	25.50
No. 315	23.00
88-10-2 ingot	
No. 210	31.00
No. 215	29.00
No. 245	23.75
Yellow ingot	
No. 405	15.75-17.00
Manganese Bronze	
No. 421	19.00

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	16.50-17.25
0.60 copper, max.	16.50-17.00
Piston alloys (No. 122 type)	14.00-16.50
No. 12 alum. (No. 2 grade)	15.50-16.00
108 alloy	16.00-16.25
195 alloy	14.00-16.50
AXS-679	16.50
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1—95 pct-95½ pct	15.25-16.00
Grade 2—92 pct-95 pct	14.00-15.00
Grade 3—90 pct-92 pct	13.50-14.50
Grade 4—85 pct-90 pct	13.25-14.00

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37⅝
Electrodeposited	32.34
Rolled, oval, straight, delivered	32.59
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	33⅜
Zinc, cast, 99.99	18¾
Nickel 99 pct plus, frt. allowed	
Cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 1000 oz lots per troy oz.	67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drub	44.50
Copper sulfate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls. frt. allowed	14.50
Silver cyanide, 100 oz lots, per oz.	54.00
Sodium cyanide, 96 pct domestic, 200 lb drums	16.00
Zinc cyanide, 100 lb drums	35.50
Zinc sulfate, 89 pct, granules, bbls, frt. allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall; 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75-S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness; 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢, 10,000 lb base. B & S gage 00-1; 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16; 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb. f.o.b. mill, freight allowed. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in. 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Round Rod: M, diam, in., ¼ to ⅜, 47¢; ½ to ¾, 45¢; 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.21; 5/16 to ⅜, $1.12; ⅜ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets		41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks		31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, lcl.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

Cents per pound, freight prepaid on 200 lb.

Effective Jan. 30, 1948

SHEETS	Base Price Per lb
Yellow brass	30.16¢
Commercial bronze	33.27¢
Copper in rolls	31.96¢
Soft sheet copper	33.68¢
WIRE AND RODS	
Yellow brass wire	30.45¢
Yellow brass (free cutting) rod	24.69¢
Yellow brass rod	29.85¢
Drawn Copper Rod	31.03¢
SEAMLESS TUBES	
Yellow brass	32.92¢
Copper	33.72¢
SCRAP ALLOWANCE	
Yellow brass	15.625¢
Copper	19.125¢
Yellow brass turnings	14.75 ¢

Scrap Metals

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Yellow brass rod turnings	14¾¢
Leaded yellow brass turnings	14¾¢
Loose yellow brass trimmings	15¾¢

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Copper and Brass

No. 1 heavy copper and wire	16½—17
No. 2 heavy copper and wire	15½—16
Light copper	14 —14½
Auto radiators (unsweated)	9½—10
No. 1 composition	12 —12½
No. 1 composition turnings	11½—12
Clean red car boxes	9¾—10¼
Cocks and faucets	9¾—10
Mixed heavy yellow brass	7¼— 7¾
Old rolled brass	7¾— 8¼
Brass Pipe	9¼— 9½
New soft brass clippings	11¼—11¾
Brass rod ends	9¾—10¼
No. 1 brass rod turnings	9¼— 9¾

Aluminum

Alum. pistons with struts	4½— 5
Aluminum crankcases	6½— 7
2S aluminum clippings	9 — 9½
Old sheet & utensils	7 — 7½
Mixed borings and turnings	— 2
Misc. cast aluminum	6½— 7
Dural clips (24S)	6 — 6½

Zinc

New zinc clippings	7 — 7½
Old zinc	5 — 5½
Zinc routings	3 — 3½
Old die cast scrap	3 — 3½

Nickel and Monel

Pure nickel clippings	16 —17
Clean nickel turnings	12½—13
Nickel anodes	16 —17
Nickel rod ends	16 —17
New Monel clippings	12 —13
Clean Monel turnings	7 — 8
Old sheet Monel	10 —10½
Old Monel castings	7½— 8
Inconel clippings	8 — 8½
Nickel silver clippings, mixed	8 — 8½
Nickel silver turnings, mixed	6½— 7

Lead

Soft scrap lead	12 —12½
Battery plates (dry)	7 — 7½

Magnesium Alloys

Segregated solids	7½— 8
Castings	4½— 5½

Miscellaneous

Block tin	75 —77
No. 1 pewter	60 —62
No. 1 auto babbitt	45 —47
Mixed common babbitt	13½—14
Solder joints	16½—17
Siphon tops	45 —47
Small foundry type	16 —16½
Monotype	15 —15½
Lino. and stereotype	14 —14½
Electrotype	11½—12
New type shell cuttings	14½—15
Clean hand picked type shells	6½— 7
Lino and stereo dross	6½— 7
Electro dross	4½— 5

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.50

For High Density Bales . . use the Self-Contained

LOGEMANN Scrap Presses

Press, Pump, Tank . . . all in one compact assembly

Available with Automatic Control

Both two and three ram models are available with automatic controls . . . and are recommended when the nature of the scrap warrants such application and where high output is desired.

You conserve floor space and piping in plants and yards where space is limited . . . and at the same time, handle high tonnages at extremely low operating cost.

Pioneers in the metal baling field, LOGEMANN engineers have embodied the features proved through actual operation to be essential to constant, uninterrupted service. These same engineers are prepared to offer suggestions as to operating layout and installation of any unusual or specific need. Present your problem to them, stating the nature of your scrap and the tonnage desired. There is no obligation.

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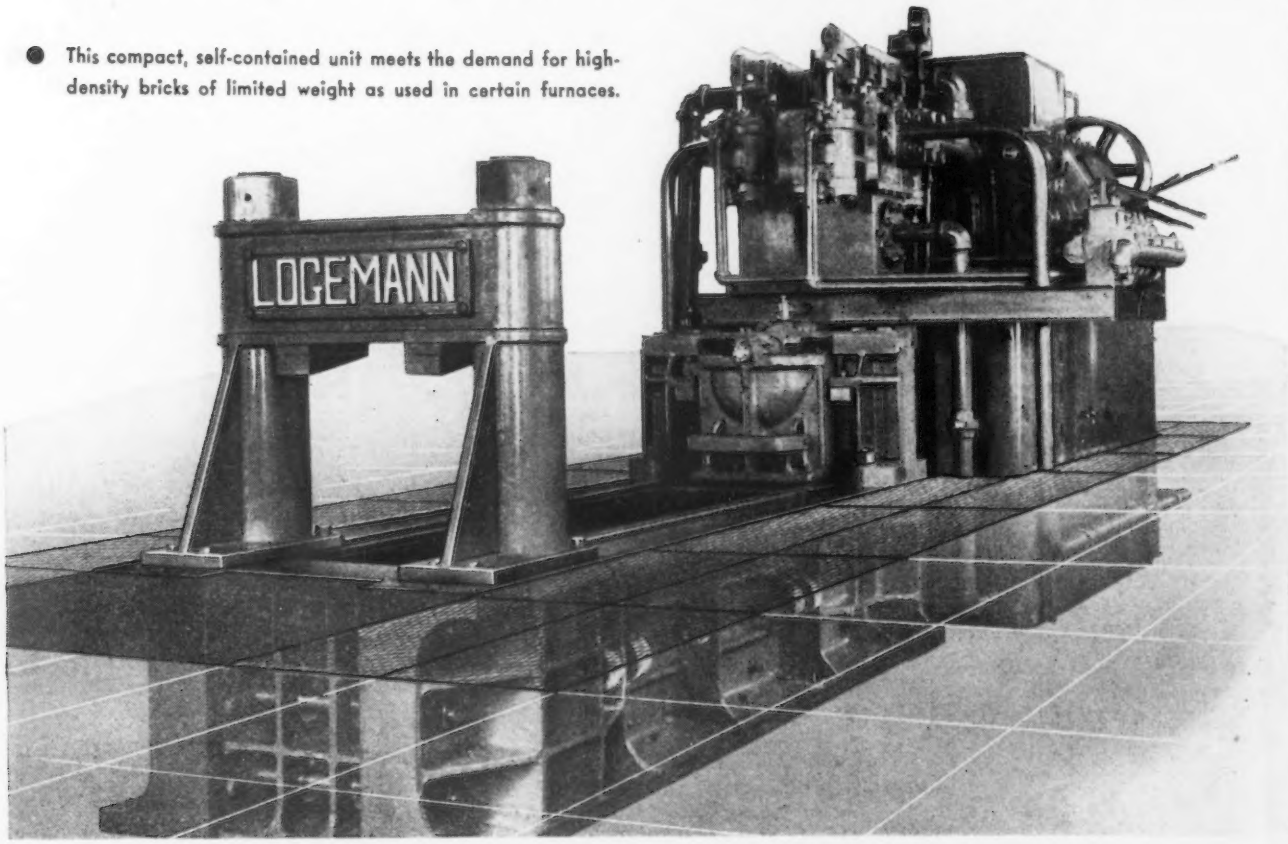
● This compact, self-contained unit meets the demand for high-density bricks of limited weight as used in certain furnaces.



Pressure Fails to Blow Lid Off Market

New York

• • • The lid stayed on this week. Some of the big mills are operating close to the board now. Scrap stockpiles at some mills are in cars only. High priced foreign scrap is coming in. A lot of money is being paid for scrap coming in with $15-$18-$20 rail freight bills attached. But the big mills still refuse to bid a new higher price for scrap in the major consuming centers.

Action of steel mills in increasing pig iron consumption at the expense of merchant iron supplies has backfired in some markets. Foundries in some districts have shed all past concepts and are bidding competitively for No. 1 heavy melting steel scrap, intensifying pressure in the "steelmaking" scrap market.

At the same time, markets in some districts that have failed to drop during the past 2 months have gone down this week. The reduction of fabricating operations in the midwest due to cold weather may cut down the available supply of scrap during the next few weeks. River ice is cutting down on barge shipments of scrap—cutting it off completely in some districts.

Foundries were beginning to feel themselves at the breaking point on cast scrap prices. They were reported to be resisting further increases in some districts, although the trend was still definitely upward. Some foundry owners state that they are at a point where they must stop bidding upward or close their plants.

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PITTSBURGH — Rails and cast iron grades were stronger this week. The line still holds on openhearth steel and some consumers are said to be toying with the idea of trying to force it down a bit. The theory would be to show sellers that $40.50 is the ceiling but not the floor. At least for the duration of this cold weather sellers say this would be indeed difficult to do. At least 5000 tons of scrap that normally comes into the district by barge each week has been cut off since Jan. 26 by river ice. Cold weather has also been one factor in slowing yard operations and is making it difficult to unload some cars. Several mills in the district are dipping into inventories which are smaller than normal for this season.

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CHICAGO — Railroad specialties broke last week following the first drop in the prices of rerolling rails and railroad heavy melting. It appears that the mills have won the formula battle and that the items used by steel and iron foundries have gone through a natural reaction. No one believes that railroad specialties will continue to go down but rather they have leveled off similar to the open hearth grades. Inventories are no better or no worse than they have been in recent weeks at the mills here. Reported inventories run from one to two weeks on the average with one producer reporting a 2 months supply on the ground.

•

PHILADELPHIA — Renewed buying of No. 1 heavy melting at a price above other heavy melting grades did not take place last week. With most local mills in a fair scrap position they are able to stay out of the market to await lower prices. Only one mill bought heavy melting scrap last week, at a price of $41 delivered for grades other than No. 1. Shipments on old orders are reported to be off. Turnings business continues at previous levels. The cast market is very strong. Breakable cast is being bought at a price of $57.

•

CLEVELAND — While rumors that major consumers of scrap would terminate their informal scrap formula Jan. 31, could not be confirmed at press time, the market continued to show strong undertones, and buyers were battling to get shipments at quoted prices. Brokers are doing business largely on an open order basis, and giving lip service to formula prices to bring some of the dealers around to shipping. Dealers, incidentally, are coming in for a lot of undeserved abuse, simply because some of them are waiting for the price of scrap to go up, an action as understandable as attempts to force the price down. Mills will pay $44 to $45 for material outside their territories to force the price down.

•

DETROIT—Another round in the scrap battle went to the formula this week when the price of low phos plate dropped back here to $5 over the basic openhearth rate. Meanwhile, the flow of scrap from yards has been reported as close to what would normally be expected under existing weather conditions. While the gas shortage which has hit production at many Detroit plants will undoubtedly cut sharply into the volume of industrial scrap the fact that steel mill production is also temporarily off may help to maintain the scrap-steel production balance. Cast iron grades are leveling off as the recent flood of cast scrap into this area has apparently met the present demands of the largest users in this territory.

BIRMINGHAM — Mills in this district report that they are obtaining tonnages sufficient to meet consumption despite inclement weather and without increasing prices. Shipyard scrap movement has declined, however, with few ships at Gulf ports being made available for wrecking. Demand for scrap has increased production of that grade from automobile graveyards.

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BUFFALO — No. 2 steel and bundles were definitely established here this week at the $39.75 formula following acceptance of firm orders by most local dealers at this price. Zero weather curtailed yard operations, but efforts of mills to increase shipments from fabricators were reported showing favorable results. Although leading local consumers refuse to pay the higher prices for turnings this section of the list was firm on outside demand. Resistance to runaway prices for cast scrap was stronger, but at the same time there were reports of distress purchases by foundries at $65 to $70 delivered for top grade stuff.

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NEW YORK—The combination of stiff price resistance and poor weather has cut scrap shipments down to a fraction of the usual business. Dealers are becoming resentful of the pressure downward on prices, and some are said to be withholding scrap for this reason. Cast grades continue their upward move. What little strictly No. 1 cupola material is moving is going up to $58 per ton. Mixed grades now go slightly below this.

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BOSTON — More mills are now offering $31.65 for heavy melting steel than offering $31.90, which smacks of weakness. In contrast, market for machine shop turnings is holding above the formula price, and gas purifiers are paying $35 for chemical borings, an advance of 85¢ a ton. Cast is not now available for less than $55, and commonly fetches $60, in dribbling lots. Most New England yards and sidings remain frozen in.

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ST. LOUIS — Prices on railroad specialties are being leveled off from $1 to $3 per ton as demand for these items by foundries slackens. However, foundries are still paying $41 to $42 for No. 1 heavy melting steel and dealers are selling to the former.

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TORONTO — Sub-zero weather which held throughout eastern Canada during the past week gave a further setback to the movement of scrap iron and steel, and dealers reported a sharp decline in receipts. Shipments from outside points were negligible and at the same time industrial plant offerings fell into a slump. Some dealers reported consumer shipments down about 50 per cent from earlier weeks this year. Consumers, both the steel mills and foundries, are running short of scrap, and there are no indications of improvement in supply before the spring.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.50
RR. hvy. melting	$41.00 to 41.50
No. 2 hvy. melting	40.50
RR. scrap rails	53.50 to 54.50
Rails 2 ft and under	58.00 to 59.00
No. 1 comp'd bundles	40.50
Hand bdld. new shts.	40.50
Hvy. axle turn.	41.50 to 42.00
Hvy. steel forge turn.	41.50 to 42.00
Mach. shop turn.	35.00 to 35.50
Shoveling turn.	38.00 to 38.50
Mixed bor. and turn.	37.00 to 37.50
Cast iron borings	37.00 to 37.50
No. 1 cupola cast.	57.50 to 58.00
Hvy. breakable cast.	43.50 to 44.50
Malleable	66.00 to 67.00
RR. knuck, and coup.	53.50 to 54.50
RR. coil springs	53.00 t o 54.50
RR. leaf springs	53.50 to 54.50
Rolled steel wheels	53.50 to 54.50
Low phos.	47.00 to 48.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50
No. 2 hvy. melting	39.50
No. 1 bundles	39.50
No. 2 dealers' bundles	39.50
Bundled mach. shop turn.	39.50
Galv. bundles	37.50
Mach. shop turn.	$34.00 to 34.50
Short shov. turn.	36.50 to 37.50
Cast iron borings	35.00 to 35.50
Mix. borings & turn.	34.00 to 34.50
Low phos. hvy. forge	50.00 to 53.00
Low phos. plates	45.00 to 46.00
No. 1 RR. hvy. melt.	41.25 to 41.75
Rerolling rails	54.50 to 55.00
Miscellaneous rails	54.00 t o 55.00
Angles & splice bars	55.00 to 56.00
Locomotive tires, cut	56.00 to 57.00
Cut bolster & side frames	45.00 to 48.00
Standard stl. car axles	57.00 to 58.00
No. 3 steel wheels	56.00 to 57.00
Couplers & knuckles	60.00 to 61.00
Rails 2 ft and under	60.00 to 61.00
Malleable	73.00 to 74.00
No. 1 mach. cast.	67.00 to 68.00
No. 1 agricul. cast.	62.00 to 63.00
Heavy breakable cast.	55.00 to 60.00
RR. grate bars	60.00 to 62.00
Cast iron brake shoes	60.00 to 61.00
Cast iron carwheels	58.00 to 60.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	38.50 to 39.50
No. 1 bundles	38.50 to 39.50
No. 2 bundles	38.50 to 39.50
Mach. shop turn.	33.00 to 33.50
Shoveling turn.	35.00 to 35.50
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	34.50 to 35.00
Low phos. plate	50.00 to 51.00
No. 1 cupola cast	67.00 to 68.00
Hvy. breakable cast	57.50 to 60.00
Rails 18 in. & under	61.00 to 65.00
Rails random length	55.00 to 57.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 hvy. melting	$33.00 to $35.00
No. 2 hvy. meltign	31.65 to 31.90
Nos. 1 and 2 bundles	31.65 to 31.90
Busheling	31.65 to 31.90
Shoveling turn.	30.00 to 31.00
Machine shop turn.	28.50 to 29.50
Mixed bor. & turn.	28.50 to 29.50
Cl'n cast. chem. bor.	34.00 to 35.00
No. 1 machinery cast.	55.00 to 60.00
No. 2 machinery cast.	55.00 to 60.00
Heavy breakable cast.	50.00 to 55.00
Stove plate	50.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$35.50
No. 2 hvy. melting	35.50
No. 1 bundles	35.50
New busheling	35.50
Flashings	35.50
Mach. shop turn.	$30.00 to 30.50
Shoveling turn.	31.00 to 31.50
Cast iron borings	31.00 to 31.50
Mixed bor. & turn.	31.00 to 31.50
Low phos. plate	39.50 to 40.50
No. 1 cupola cast	55.00 to 60.00
Heavy breakable cast.	49.00 to 54.00
Stove plate	52.00 to 54.00
Automotive cast	55.00 to 60.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	40.00 to 41.00
Mach. shop turn.	35.00 to 35.50
Shoveling turn.	36.00 to 36.50
Mixed bor. & turn.	35.00 to 35.50
Clean cast chemical bor.	40.00 to 42.00
No. 1 machinery cast.	58.00 to 60.00
No. 1 mixed yard cast.	56.00 to 57.00
Hvy. breakable cast.	56.00 to 57.00
Clean auto cast.	58.00 to 60.00
Hvy. axle forge turn.	43.50 to 44.50
Low phos. plate	47.00 to 48.00
Low phos. punchings	47.00 to 48.00
Low phos. bundles	46.00 to 47.00
RR. steel wheels	51.00 to 52.00
RR. coil springs	51.00 to 52.00
RR. malleable	70.00 to 75.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.50 to 38.50
Bundled sheets	37.50 to 38.50
Mach. shop turn.	33.00 to 33.50
Locomotive tires, uncut	50.00 to 52.00
Mis. std sec rails	52.00 to 53.00
Rerolling rails	53.00 to 54.00
Steel angle bars	57.00 to 58.00
Rails 3 ft and under	59.00 to 60.00
RR. steel springs	50.00 to 51.00
Steel car axles	52.00 to 53.00
Grate bars	56.00 to 57.00
Brake shoes	55.00 to 56.00
Malleable	71.00 to 72.00
Cast iron car wheels	56.00 to 57.00
No. 1 machinery cast.	66.00 to 67.00
Hvy. breakable cast.	54.00 to 55.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	37.50 to 38.50
No. 2 bundles	37.50 to 38.50
No. 1 busheling	37.50 to 38.50
Long turnings	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	26.00 to 27.00
Bar crops and plate	38.00 to 38.50
Structural and plate	38.00 to 38.50
No. 1 cupola cast.	60.00 to 65.00
Stove plate	55.00 to 58.00
No. 1 RR. hvy. melt.	37.50 to 38.50
Steel axles	38.00 to 39.00
Scrap rails	44.00 to 45.00
Rerolling rails	52.00 to 54.00
Angles & splice bars	47.50 to 50.00
Rails 3 ft. & under	52.00 to 56.00
Cast iron carwheels	48.00 to 50.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $40.50
No. 2 hvy. melting	40.00 to 40.50
Mach. shop turn.	35.00 to 35.50
Short shov. turn.	36.00 to 36.50
Cast iron borings	36.00 to 36.50
Low phos.	47.50 to 48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.50
No. 2 hvy. melting	34.50
No. 2 bundles	34.50
Comp. galv. bundles	$32.00 to 33.00
Mach. shop turn.	30.00 to 31.00
Mixed bor. & turn.	30.00 to 31.00
Shoveling turn.	30.00 to 31.00
No. 1 cupola cast	55.00 to 58.00
Clean auto cast	55.00 to 58.00
Hvy. breakable cast	52.00 to 53.00
Charging box cast.	52.00 to 53.00
Stove plate	50.00 to 51.00
Unstrp. motor blks.	49.00 to 50.00
Cl'n chem. cast bor.	33.50 to 34.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	39.75
No. 1 bundles	39.75
No. 2 bundles	39.75
No. 1 busheling	39.75
Mach. shop turn.	36.00 to 37.00
Shoveling turn.	38.00 to 39.00
Cast iron borings	33.00 to 34.00
Mixed bor. & turn.	33.00 to 34.00
Mixed cupola cast	53.00 to 55.00
Charging box cast.	48.00 to 50.00
Stove plate	52.00 to 54.00
Clean auto cast.	58.00 to 60.00
RR. malleable	70.00 to 75.00
Small indl. malleable	47.00 to 49.00
Low phos. plate	46.00 to 49.00
Scrap rails	58.00 to 59.00
Rails 3 ft & under	60.00 to 61.00
RR. steel wheels	50.00 to 51.00
Cast iron carwheels	50.00 to 51.00
RR. coil & leaf sprgs.	50.00 to 51.00
RR. knuckles & coup.	50.00 to 51.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	39.50 to 40.00
No. 1 bundles	39.50 to 40.00
No. 1 busheling	39.50 to 40.00
Drop forge flashings	39.50 to 40.00
Mach. shop turn.	34.50 to 35.00
Shoveling turn.	36.50 to 37.00
Steel axle turn.	39.50 to 40.00
Cast iron borings	35.50 to 36.00
Mixed bor. & turn.	34.50 to 35.00
Low phos.	44.50 to 45.00
No. 1 machinery cast.	60.00 to 65.00
Malleable	70.00 to 72.00
RR. cast.	63.00 to 65.00
Railroad grate bars	57.50 to 58.00
Stove plate	57.50 to 58.00
RR. hvy. melting	40.00 to 40.50
Rails 3 ft & under	57.00 to 61.00
Rails 18 in. & under	57.00 to 61.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting	$25.00
No. 2 hvy. melting	25.00
No. 2 bales	25.00

Per gross ton delivered to consumer:

No. 3 bales	$19.50
Mach. shop turn.	16.00
Elec. furn. 1 ft und.	$32.00 to 34.00
No. 1 cupola cast.	32.00 to 33.00
RR. hvy. melting	26.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$25.50
No. 2 hvy. melting	25.50
No. 1 bales	25.50
No. 2 bales	25.50
No. 3 bales	19.50
Mach. shop turn.	17.50
No. 1 cupola cast.	$36.00 to 40.00
RR. hvy. melting	26.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$25.50 to $26.50
Elec. furn. 1 ft and und.	27.50 to 30.00
No. 1 cupola cast.	27.50
RR. hvy. melting	25.00 to 26.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point.

Heavy melting	$22.00*
No. 1 bundles	22.00*
No. 2 bundles	21.50*
Mechanical bundles	20.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.00*
Bushelings, new fact, prep'd	21.00*
Bushelings, new fact, unprep'd	16.00*
Short steel turnings	17.00*
No. 1 cast	$42.00 to 43.00
No. 2 cast	35.00 to 37.00

*Ceiling Price.

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Feb. 3, 1948	Jan. 27, 1948	Jan. 6, 1948	Feb. 4, 1947
Hot-rolled sheets	2.80	2.80	2.80	2.50
Cold-rolled sheets	3.55	3.55	3.55	3.20
Galvanized sheets (10 ga.)	3.95	3.95	3.95	3.55
Hot-rolled strip	2.80	2.80	2.80	2.50
Cold-rolled strip	3.55	3.55	3.55	3.20
Plates	2.95	2.95	2.95	2.65
Plates wrought iron	6.85	6.85	6.85	5.95
Stain's c-r strip (No. 302)	30.50	30.50	30.50	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$6.80	$6.80	$6.80	$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special coated mfg. ternes	5.90	5.90	5.90	4.90
Bars and Shapes: (cents per pound)				
Merchant bars	2.90	2.90	2.90	2.60
Cold-finished bars	3.55	3.55	3.55	3.20
Alloy bars	3.30	3.30	3.30	3.05
Structural shapes	2.80	2.80	2.80	2.50
Stainless bars (No. 302)	26.00	26.00	26.00	26.00
Wrought iron bars	7.15	7.15	7.15	6.15
Wire and Wire Products: (cents per pound)				
Bright wire	3.55	3.55	3.55	3.30
Wire nails	4.75	4.75	4.25	3.75
Rails: (dollars per 100 lb)				
Heavy rails	$2.75	$2.75	$2.75	$2.50
Light rails	3.10	3.10	3.10	2.85
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$45.00	$45.00	$45.00	$42.00
Slabs, rerolling	45.00	45.00	45.00	42.00
Forging Billets	55.00	55.00	55.00	50.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	61.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.80	2.80	2.80	2.55
Skelp	2.60	2.60	2.60	2.35

Pig Iron: (per gross ton)	Feb. 3, 1948	Jan. 27, 1948	Jan. 6, 1948	Feb. 4, 1947
No. 2, foundry, Phila.	$44.61	$44.61	$44.61	$32.51
No. 2, Valley furnace	39.50	39.50	39.00	30.50
No. 2, Southern Cin'ti	43.28	43.28	43.28	31.75
No. 2, Birmingham	37.38	37.38	37.38	26.88
No. 2, foundry, Chicago†	39.00	39.00	38.00	30.50
Basic del'd Philadelphia	44.11	44.11	44.11	33.67
Basic, Valley furnace	39.00	39.00	38.50	30.00
Malleable, Chicago†	39.50	39.50	38.50	30.50
Malleable, Valley	39.50	39.50	39.50	30.50
Charcoal, Chicago	62.46	62.46	57.46	42.99
Ferromanganese‡	145.00	145.00	145.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$40.50	$40.50	$40.00	$33.25
Heavy melt'g steel, Phila.	42.50	42.50	40.50	32.00
Heavy melt'g steel, Ch'go	39.50	39.50	39.50	29.75
No. 1, hy. comp. sheet, Det.	35.50	35.50	35.00	27.00
Low phos. Young'n	47.75	47.75	47.25	34.25
No. 1, cast, Pittsburgh	57.75	56.75	55.00	40.50
No. 1, cast, Philadelphia	59.00	59.00	55.50	44.50
No. 1, cast, Chicago	*67.50*	69.50	63.50	44.25
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$12.50	$12.50	$12.50	$8.75
Foundry coke, prompt	14.00	14.00	14.00	8.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro. Conn.	21.50	21.50	21.50	19.50
Copper, Lake Conn.	21.625	21.625	21.625	19.625
Tin, Grade A, New York	94.00	94.00	94.00	70.00
Zinc, East St. Louis	12.00	12.00	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	12.80
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	36.56	36.56	36.56	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.25

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Feb. 3, 1948	3.18925¢ per lb.	$40.17 per gross ton	$40.83 per gross ton
One week ago	3.18925¢ per lb.	$40.17 per gross ton	$40.83 per gross ton
One month ago	3.18925¢ per lb.	$39.00 per gross ton	$40.00 per gross ton
One year ago	2.87255¢ per lb.	$30.15 per gross ton	$31.67 per gross ton

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1948	3.18925¢ Jan. 13		$40.17 Jan. 29	$39.58 Jan. 6	$41.83 Jan. 20	$40.00 Jan. 6
1947	3.18925¢ Aug. 12	2.87118¢ Jan. 7	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb & over. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Hollowware enameling, gages 29 to 31 only. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only. (14) Kaiser Co. prices (15) to 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (16) Delivered Los Angeles; add ½¢ per 100 lb for San Francisco. (17) Slab prices subject to negotiation in most cases. Some producers charge (18) $2 more. (19) $1 more. (20) $6 more.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		San Franc'co. Los Angeles, Seattle	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling					($36.00 f. o. b. mill)		(Spot market as high as $86 to $90 gross ton)								
Carbon, forging	$46.00														
Alloy	$56.00									(Canton = $56.00)					
BILLETS, BLOOMS, SLABS															
Carbon, rerolling[17]	$45.00[18]	$45.00[18]	$45.00[18]	$47.00	$45.00[18]	$45.00[18]							$48.20[18]		
Carbon, forging billets	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00							$58.20		
Alloy	$66.00	$66.00				$66.00	(Bethlehem, Massillon, Canton = $66.00)								
SHEET BARS								Subject to negotiation							
PIPE SKELP	2.60¢[20]						2.60¢[20]								
WIRE RODS	2.80¢[19]	2.80¢[19]		2.80¢[19]	2.85¢		(Worcester = 2.90¢[19])					3.52¢[13]			
SHEETS															
Hot-rolled	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢		(Ashland, Ky. = 2.80¢)		3.54¢[16]	2.96¢	3.148¢	3.040¢
Cold-rolled[1]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢			3.71¢	4.00¢	4.016¢
Galvanized (10 gage)	3.95¢	3.95¢	3.95¢		3.95¢		3.95¢	3.95¢	4.05¢	3.95¢	(Ashland = 3.95¢)	4.62¢[16]		4.298¢	4.190¢
Enameling (12 gage)	3.95¢	3.95¢	3.95¢	3.95¢			3.95¢		4.05¢	3.95¢			4.11¢	4.466¢	4.408¢
Long ternes[2] (10 gage)	4.05¢		4.05¢											4.566¢	4.506¢
STRIP															
Hot-rolled[3]	2.80¢	2.80¢	2.80¢	2.80¢[15]	2.80¢		2.80¢					3.60¢[16]	2.96¢	3.316¢	3.256¢
Cold-rolled[4]	3.55¢	3.65¢	3.65¢	3.55¢			3.55¢			(Worcester = 3.75¢)			3.71¢	4.066¢	4.006¢
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢							3.616¢	
TINPLATE															
Cokes, 1.50 lb[5], base box	$6.80	$6.80	$6.80		$6.90			$6.90	$6.90	(Warren, Ohio = $6.80)				$7.248	$7.140
Electro, box { 0.25 lb / 0.50 lb / 0.75 lb }	Deduct $1.00 from 1.50 lb coke base box price. Deduct 80¢ from 1.50 lb coke base box price. Deduct 60¢ from 1.50 lb coke base box price.														
TERNES, MFG., special coated	Deduct 90¢ from 1.50 lb coke base box price.														
BLACKPLATE, CANMAKING															
55 lb to 70 lb	Deduct $1.60 from 1.50 lb coke base box.														
75 lb to 95 lb	Deduct $1.70 from 1.50 coke base box.														
100 lb to 128 lb	Deduct $1.60 lb from 1.50 lb coke base box.														
BLACKPLATE, h. e. 29 ga[11]	4.75¢	4.75¢	4.75¢		4.85¢			4.85¢	4.85¢					5.198¢	5.090¢
BARS															
Carbon steel	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢					3.625¢[16]	3.06¢	3.35¢	3.356¢
Rail steel[6]	Subject to negotiation because of fluctuating scrap prices.														
Reinforcing (billet)[7]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢				3.325¢[16]		3.098¢	2.990¢
Reinforcing (rail)	Subject to negotiation because of fluctuating scrap prices.														
Cold-finished[8]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢							3.71¢	4.00¢	4.006¢
Alloy, hot-rolled	3.30¢	3.30¢	3.30¢			3.30¢	3.30¢	(Bethlehem, Massillon, Canton = 3.30¢)							3.432¢
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢			(Canton = 4.10¢)						
PLATE								(Coatesville = 3.45¢, Claymont = 3.65¢, Geneva, Utah = 3.10¢)							
Carbon steel[12]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢		2.95¢	2.95¢				3.838¢[14]		3.298¢	3.190¢
Floor plates	4.20¢	4.20¢												4.716¢	4.656¢
Alloy	3.80¢	3.80¢	3.80¢		(Coatesville = 4.80¢)									4.316¢	4.256¢
SHAPES, Structural	2.80¢	2.80¢	2.80¢		2.80¢	2.80¢	(Geneva, Utah = 2.95¢, Bethlehem = 2.80¢)					3.43¢[10]		3.040¢	2.932¢
SPRING STEEL, C-R															
0.08 to 0.40 carbon	3.55¢			3.55¢			(Worcester = 3.75¢)								
0.41 to 0.60 carbon	5.05¢			5.05¢			(Worcester = 5.25¢)								
0.61 to 0.80 carbon	5.65¢			5.65¢			(Worcester = 5.85¢)								
0.81 to 1.05 carbon	7.15¢			7.15¢			(Worcester = 7.35¢)								
1.06 to 1.35 carbon	9.45¢			9.45¢			(Worcester = 9.65¢)								
MANUFACTURERS' WIRE[9]															
Bright	3.55¢	3.55¢		3.55¢	3.55¢		(Worcester = 3.65¢, Duluth = 3.60¢)					4.56¢[13]		4.022¢	4.006¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.60¢	4.60¢		4.60¢	(Worcester = 4.70¢, Duluth = 4.85¢) (Trenton = 4.85¢)							5.737¢[13]		5.072¢	4.964¢
PILING, Steel sheet	3.30¢	3.30¢				3.30¢								3.75¢	3.756¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	Subject to negotiation			Subject to negotiation		
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	Subject to negotiation			Subject to negotiation		
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt, Beth.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville, Beth, Brackenridge	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton, Brackenridge, Balt, Coatesville	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt, Brackenridge	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Jersey City, Reading, Canton, Youngstown, Balt, W. Leechburg	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton, W. Leechburg	32.48	30.30	23.80	24.34	34.82	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	28.75
Tubing, seamless, P'gh, Chi, Canton, Brackenridge, Milwaukee	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	82¢
18	4	1	—	5	$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢

High-carbon-chromium*	47¢
Oil hardening manganese*	26¢
Special carbon*	24¢
Extra carbon*	20¢
Regular carbon*	17¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.50¢
Armature	4.80¢
Electrical	5.30¢
Motor	6.05¢
Dynamo	6.75¢
Transformer 72	7.25¢
Transformer 65	7.95¢
Transformer 58	8.65¢
Transformer 52	9.45¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.75
Angle splice bars, 100 lb	3.85
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$3.10

	Base per lb
Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.65¢
Tie plates, Pittsburg, Calif.	3.80¢
Track bolts	7.00¢
Track bolts, heat treated, to railroads	7.25¢

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, St. Louis, Kansas City, Minnequa, Colo.; Birmingham; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$7.05	$14.10

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	21.50	.....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	.....
Monel-clad 10 pct, f.o.b. Coatesville	24.00	.....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	.....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham, Duluth

	Base per keg	Delivered San Francisco
Standard & coated nails	$4.75†	$5.75
Galvanized nails‡‡	4.75†	5.75
Cut nails, carloads, Pittsburgh base	6.30*	.....

† 30¢ additional at Worcester. ‡‡ Plus $2.50 to $3.00 per 100 lb galvanizing extra. * Less 20¢ to jobbers.

	Base per 100 lb	
Annealed fence wire	$4.20‡	$5.21
Annealed galv. fence wire	4.65‡	5.66

‡ 10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base column	
Woven wire fence*	100	123
Fence posts, carloads	105††	...
Single loop bale ties	99	123
Galvanized barbed wire**	113	133
Twisted barbless wire	113	...

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. †† Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Sheets									
Hot-rolled	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30
Cold-rolled	5.30	5.30	5.30	....	5.30	5.30	5.30	5.30	5.30
Galvanized	....	6.00	....	....	....	6.00	....	....	....
Strip									
Hot-rolled	4.30	4.30	4.30	....	4.30	4.30	4.30	4.30	4.30
Cold-rolled	....	....	5.30	....	....	5.30	5.30	5.30	5.30†
Shapes	....	4.30	....	....	4.30	4.30	4.30	4.30	....
Beams	....	4.30	....	....	....	4.30	....	....	....
Bars									
Hot-rolled	4.45	4.45	4.45	....	....	4.45	4.45	4.45	4.45
Bar shapes	....	4.45	....	....	4.45	4.45	4.45	4.45	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only
Base price, $288.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
⅛-in.	50½	34½
¼-in.	53½	38½
1-in.	56	41½
1¼-in.	56½	42
1½-in.	57	42½
2 in.	57½	43
2½ and 3-in.	58	43½
Wrought Iron, buttweld		
⅛-in.	+ 7	+29
¼-in.	2½	+19
1 and 1¼-in.	8	+11
1½-in.	13½	+ 7½
2-in.	14	+ 7
Steel, lapweld		
2-in.	49	34
2½ and 3-in.	52	37
3½ to 6-in.	54	39
Steel, seamless		
2-in.	48	33
2½ and 3-in.	51	36
3½ to 6-in.	53	38
Wrought Iron, lapweld		
2-in.	5½	+14½
2½ to 3½-in.	8	+10½
4-in.	12	+ 5
4½ to 8-in.	10	+ 6½

Extra Strong, plain ends

Steel, buttweld		
⅛-in.	49½	35
¼-in.	53½	39
1-in.	55½	42
1¼-in.	56	42½
1½-in.	56½	43
2-in.	57	43½
2½ and 3-in.	57½	44
Wrought Iron, buttweld		
⅛-in.	+ 2½	+23
¼-in.	3½	+17
1 to 2-in.	13	+ 7
Steel, lapweld		
2-in.	48	34
2½ and 3-in.	52	38
3½ to 6-in.	55½	41½
Steel, seamless		
2-in.	47	33
2½ and 3-in.	51	37
3½ and 6-in.	54½	40½
Wrought Iron, lapweld		
2-in.	8½	+11
2½ to 4-in.	17½	+ ½
4½ to 6-in.	13	+ 5

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

		Seamless		Electric Weld	
OD in.	Gage BWG	Hot-Rolled	Cold-Drawn	Hot-Rolled	Cold-Drawn
2	13	$16.67	$19.99	$16.17	$19.39
2½	12	22.42	26.87	21.75	26.06
3	12	24.93	29.90	24.18	29.00
3½	11	31.17	37.39	30.23	36.27
4	10	38.69	46.38	37.53	44.99

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in. del'd Chicago	$91.12
6-in. to 24-in. del'd New York	89.18
6-in. to 24-in., Birmingham	79.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	105.90

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Percent Off List
½ in. & smaller x 6 in. & shorter	45
9/16 & ⅝ in. x 6 in. & shorter	46
¾ in. & larger x 6 in. & shorter	43
All diam, longer than 6 in.	41
Lag, all diam over 6 in. long	44
Lag, all diam x 6 in. & shorter	46
Plow bolts	54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	43
9/16 to 1 in. inclusive	42
1⅛ to 1½ in. inclusive	40
1⅝ in. and larger	35

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
7/16 in. and smaller	..	46
½ in. and smaller	44	..
½ in. through 1 in.	..	44
9/16 in. through 1 in.	43	..
1⅛ in. through 1½ in.	41	42
1⅝ in. and larger	35	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate ..... 65 and 10
In bulk 75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets *(½ in. and larger)*

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.65
F.o.b. Lebanon, Pa.	5.80

Small Rivets *(7/16 in. and smaller)*

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55

Cap and Set Screws

(In packages)	*Percent Off List*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	53
¾ to 1 in. x 6 in., SAE 1035, heat treated	44
Set screws, oval points	56
Milled studs	29
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	37

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$35.00
65% but less than 70%	34.00
60% but less than 65%	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports*)

	Per Gross Ton
Old range, bessemer	$5.95
Old range, nonbessemer	5.80
Mesabi, bessemer	5.70
Mesabi, nonbessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDER

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh	30⅝¢ to 34½¢
Copper, reduced, 150 and 200 mesh	30½¢ to 32¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots	10¢ to 17¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8.5¢
Domestic sponge iron, minus 48 mesh	10¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	44¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	39½¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 29¢
Antimony, 100 mesh	44¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.025
Lead, 100, 200 & 300 mesh	20½¢ to 25½¢
Manganese, minus 325 mesh and coarser	59¢
Nickel, 100 mesh	51½¢
Silicon, 100 mesh	29¢
Solder powder, 100 mesh	8½¢ plus metal
Stainless steel, 302, minus 100 mesh	75¢
Tin, 100 mesh	90¢
Tungsten metal powder, 98%-99%, any quantity, per lb.	$3.00
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	$2.65
Under 100 lb	$2.90

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$12.00 to $13.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	13.50 to 14.50
Foundry, Byproduct	
Chicago, del'd	$18.60
Chicago, f.o.b.	17.50
New England, del'd	19.75
Seaboard, Kearney, N. J., f.o.b.	17.85
Philadelphia, f.o.b.	17.75
Swedeland, Pa., f.o.b.	17.75
Buffalo, del'd	20.15
Ashland, Ohio, f.o.b.	15.50
Painesville, Ohio, f.o.b.	16.60
Erie, del'd	19.95
Cleveland, del'd	17.90
Cincinnati, del'd	18.59
St. Louis, del'd	18.02
Birmingham, del'd	15.76

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Carloads, Per 1000*
No. 1 Ohio	$67.00
First quality, Pa., Md., Ky., Mo., Ohio	73.00
First quality, New Jersey	78.00
Sec. quality, Pa., Md., Ky., Mo., Ohio	67.00
Sec. quality, New Jersey	70.00
No. 2 Ohio	59.00
Ground fire clay, net ton, bulk	10.50

Silica Brick	
Pennsylvania and Birmingham	$73.00
Chicago District and Alabama	82.00
Silica cement, net ton (Eastern)	12.50
East Chicago	13.50

Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$64.00

Magnesite Brick	
Standard, Balt. and Chester	$86.00
Chemically bonded, Baltimore	75.00

Grain Magnesite *std. ⅜-in. grains*	
Domestic, f.o.b. Balt. and Chester in bulk, fines removed	$51.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	27.00
in sacks with fines	31.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢ $11.00

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.51	$5.78	$5.91	$4.83	$5.73	$4.86	$4.57	$4.88	$5.53	$8.52	$8.67	$10.13	$10.28
New York	4.76	5.78[1]	6.16	5.09	6.07	5.11	4.78	5.08	5.63	8.58	8.73	10.18	10.33
Boston	....	....	....	....	....	....	....	....	....	....	....	....	....
Baltimore	4.33	....	5.73	4.81	....	4.78	4.73	4.86	5.56	....	....	....	....
Norfolk	4.90	....	....	5.30	....	5.15	5.15	5.20	6.00	....	....	....	....
Chicago	4.25	5.10	5.65	4.35	5.45	4.60	4.40	4.40	5.10	8.20	8.35	9.50	9.65
Milwaukee	4.458	5.308	5.858	4.458	5.658	4.808	4.608	4.608	5.308	8.58	8.708	9.858	10.008
Cleveland	4.25	5.10[1]	5.81	4.55	....	4.60†	4.68	4.40	5.10	8.51	8.66	9.50	9.65
Buffalo	4.25	5.10	6.05	5.25	5.70[5]	5.00	4.40‡	4.40‡	5.10	8.20	8.35	9.50	9.65
Detroit	4.57	5.42	6.07	4.77	5.67	4.92	4.82	4.50	5.22	8.69	8.84	9.97	10.12
Cincinnati	4.55	5.21	5.76	4.79	5.74	4.99	4.84	4.79	5.49	8.73	8.88	10.04	10.19
St. Louis	4.61	5.46	6.07	4.71	5.87	4.96	4.76	4.76	5.52	8.77	8.92	10.07	10.22
Pittsburgh	4.25	5.10[1]	5.65	4.35	....	4.60	4.40	4.40	5.10	8.20	8.37	9.50	9.65
St. Paul	4.68	5.53	6.08	4.78	....	5.03	4.83	4.83	6.00	....	....	....	....
Omaha	5.262	....	6.62	5.362	....	5.612	5.412	5.412	6.112	....	....	....	....
Indianapolis	4.59	5.36	5.91	4.69	5.79	4.94	....	4.74	5.44	....	....	....	....
Birmingham	4.45[11]	....	5.65	4.45[11]	....	....	....	....	6.13	....	....	....	....
Memphis	4.88[11]	5.94[1]	6.43	5.08[11]	....	5.23[11]	5.03[11]	5.03[11]	5.94	....	....	....	....
New Orleans	*5.05[11]	6.39[1]	....	5.25[11]	....	5.40[11]	*5.10[11]	*5.20[11]	6.39[6]	....	....	....	....
Houston	5.75[9]	....	7.36	6.00[9]	....	5.85[9]	5.85[9]	5.35[17]	7.00	9.40	9.25	10.40	10.55
Los Angeles	5.75	7.35[1]	7.40	6.05	8.70[5]	5.55	5.35	5.50	7.35[14]	9.70[15]	9.55[10]	11.15[15]	11.30[15]
San Francisco	5.40[8]	6.65	7.05	8.70	....	5.50	5.30	5.05	7.50	9.70[15]	9.55[15]	11.15[15]	11.30[15]
Seattle	5.45[4]	7.25[2]	6.85	5.60[4]	....	5.60[4]	5.25[4]	5.45[4]	7.45[14]	....	8.55[16]	....	11.15[16]
Portland	5.30[4]	7.10[2]	6.70	5.60[4]	....	5.45[4]	5.25[4]	5.55[4]	7.45[14]	....	....	....	....
Salt Lake City	6.40	....	7.85	6.70	....	6.20	6.35	6.55	7.55	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 399 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

* Add 46¢ for sizes not rolled in Birmingham

† Up to ¾ in. thick and 90 in. wide.

‡ Add 40¢ for sizes not rolled at Buffalo.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT* PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	40.00	40.50	41.00	41.50	.....
Birmingham	38.88	36.38-39.38	.....	.....	.....
Buffalo	40.00-42.50*	40.00-43.00*	40.50	.....	.....
Chicago	38.50	39.00	39.50	40.00	.....
Cleveland	38.50-39.75*	39.00-40.25*	39.50-40.75*	.....	.....
Duluth	39.00	39.50	40.00	40.50	.....
Erie	38.50	39.00	39.50	40.00	.....
Everett		45.00	45.50	.....	.....
Granite City	39.50	40.00	40.50	.....	.....
Neville Island	39.00	39.50	39.50	40.00	.....
Provo	39.00	39.50	.....	.....	.....
Sharpsville	39.00	39.50	39.50	40.00	.....
Steelton	40.00	.....	.....	.....	46.00
Struthers, Ohio	39.50	.....	.....	.....	.....
Swedeland	45.00	45.50	46.00	46.50	.....
Toledo	38.50	39.00	39.50	40.00	.....
Troy, N. Y.	.....	.....	.....	.....	46.00
Youngstown	39.00	39.50	39.50	40.00	.....

DELIVERED PRICES† (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	....	45.50	46.00	.....	.....
Boston	Steelton	5.78	45.78	....	....	....	51.78
Brooklyn	Bethlehem	3.60	43.60	44.10	44.60	45.10	.....
Cincinnati	Birmingham	5.85	44.73	42.23-45.23	.....	.....	.....
Jersey City	Bethlehem	2.21	42.21	42.71	43.21	43.71	.....
Los Angeles	Provo	7.13	46.13	46.63	....	....	.....
Mansfield	Cleveland-Toledo	2.56	41.06-42.31*	41.56-42.81*	42.06-43.31*	42.56	.....
Philadelphia	Bethlehem	2.00	42.00	42.50	43.00	43.50	.....
Philadelphia	Swedeland	1.21	46.21	46.71	47.21	47.71	.....
Philadelphia	Steelton	2.59	42.59	....	....	.....	48.59
San Francisco	Provo	7.13	46.13	46.63	.....	.....	.....
Seattle	Provo	7.13	46.13	46.63	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	40.25	40.75	41.25	.....	.....

* Republic Steel Corp. price. Basis: Average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Basing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$49.50; f.o.b. Buffalo—$50.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $55.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $62.46. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk) $145
Less ton lots (packed) 189.00
Delivered Pittsburgh 151.00

$1.80 for each 1% above 82% Mn; penalty, $1.80 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk ...	8.70	8.95	9.50
Ton lots	10.30	10.90	12.80
Less ton lots ...	11.20	11.80	13.70

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$46.00	$47.00
F.o.b. Pittsburgh	50.00	51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk 32
L.c.l. lots 34

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads 32
Ton lots 34
Less ton lots 36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.07% max. C. 0.06% P, 90% Mn.	23.00	24.85	26.05
0.10% max. C.	22.50	24.35	25.55
0.15% max. C.	22.00	23.85	25.05
0.30% max. C.	21.50	23.35	24.55
0.50% max. C.	21.00	22.85	24.05
0.75% max. C., 7.00% max. Si.	18.00	19.85	21.05

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload bulk 7.80
Ton lots 9.45
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet 8.75
Ton lots 10.35
Less ton lots 11.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, openhearth $78.00, foundry, $79.00; $78.75 f.o.b. Niagara Falls; $77.50 f.o.b. Jackson, Ohio. Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe..	16.90	17.50	18.10
97% Si, 1% Fe..	17.30	17.90	18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk ...	5.25	5.50	5.70
Ton lots	6.85	7.45	7.75
Less ton lots ...	7.75	8.35	8.65

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	15.50	....	....
50% Si	9.30	9.80	10.00
75% Si	11.80	12.10	12.85
85% Si	13.30	13.60	14.35
90% Si	15.00	15.30	16.00

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	26.50	26.90	27.00
0.10% C	26.00	26.40	26.50
0.15% C	25.50	25.90	26.00
0.20% C	25.25	25.65	25.75
0.50% C	25.00	25.40	25.50
1.00% C	24.50	24.90	24.75
2.00% C	24.25	24.65	24.75
65-69% Cr, 4.9% C	18.60	19.00	19.15
62-66% Cr. 4-6% C. 6-9% Si.	18.60	19.00	19.15

Briquets — Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk ...	12.50	12.75	12.85
Ton lots	14.00	14.90	15.50
Less ton lots....	14.90	15.80	16.40

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	19.70	20.10	20.25
Ton lots	21.85	23.15	23.95
Less ton lots ...	23.35	24.65	25.45

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% mn, 1.25% max. C.

	Eastern	Central	Western
Carload	25.00	25.40	25.50
Ton lots	27.30	27.95	29.15
Less ton lots ...	29.10	29.75	30.95

Chromium Metal

Contract prices, cents per lb, chromium contained carload packed, f.o.b. shipping point freight allowed, 97% min. Cr. 1% max. Fe.

	Eastern	Central	Western
0.20% max. C. ..	97.00	98.50	99.75
0.50% max. C. ..	93.00	94.50	95.75
9.00% min. C. ..	91.50	93.00	94.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe r 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	16.25	16.75	18.80
Ton lots	19.35	20.10	22.25
Less ton lots	20.85	21.60	23.75

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	17.50	18.00	20.05
Ton lots	19.80	20.65	22.40
Less ton lots ...	20.80	21.65	23.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast Turnings	Distilled
Ton lots $1.85	$2.70	$3.40
Less ton lots 2.20	3.05	4.20

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-500% C.

	Eastern	Central	Western
Ton lots	18.00	19.10	21.05
Less ton lots ...	19.25	20.35	22.30

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	15.75	16.85	18.80
Less ton lots ...	17.00	18.10	20.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed... $2.25

Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.

Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)...	3.10

Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2 ..... $1.20

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb

Ton lots	$2.50
Less ton lots	$2.55

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. ..... 95¢

Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo. ..... 80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo..... 80¢

Molybdenum oxide in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo..... 80¢

Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti $1.22
Less ton lots $1.25

Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti $1.35
Less ton lots $1.40

High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton....$142.50

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton $65.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Carload lots ..... 18.40¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy
Carload, bulk ..... 6.00¢

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
Carload ..... 6.90¢
Ton lots ..... 7.40¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Car lots ..... 9.50¢
Ton lots ..... 10.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

Eastern	Central	Western
$1.20	$1.23	$1.21

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots ...	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots..	$1.80	$1.8125	$1.8445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.
Carload lots ..... 39.00¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	93¢
No. 6	63¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15-17%, B 0.90-1.15%, Si 2.5-3.0%, Al 1.0-2.0%.
Ton lots, per pound ..... 8.0¢

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3%-4%, Si 40%-45%, per lb contained B.....$6.25

(CONTINUED FROM PAGE 130)

Cincinnati Die Casting Co., 2117 Spring Grove Ave., Cincinnati.

Cleveland Hy-Pressure Casting Co., 5400 Brookpark Rd., Cleveland 9.

Congress Die Casting Div., 3750 E. Outer Drive, Detroit.

Dayton Die Casting Co., 111 Front St., Dayton 2.

DeCardy Bros. Co., 1806 N. Keeler Ave., Chicago 39.

DOEHLER-JARVIS CORP., 386 4th Ave., New York.

Dollin Corp., 610 21st St., Irvington 11, N. J.

ELECTRIC AUTO-LITE CO., Die Casting Div., Woodstock, Ill.

Federal Die Casting Co., 2222 Elston Ave., Chicago 14.

Gerity-Michigan Die Casting Co., 8651 E. Seven Mile Rd., Detroit 12.

HARVLLE CORP., 6251 W. Century Blvd., Los Angeles 43.

Heick Die Casting Corp., 6550 W. Diversey Ave., Chicago 35.

Hoover Co., The, Maple St., North Canton, Ohio.

Krone Die Casting Co., Paul, 1815 N. Koster Ave., Chicago 39.

Latrobe Die Casting Co., Unity St., Latrobe, Pa.

Madison-Kipp Corp., 210 Waubesa St., Madison, Wis.

Mason, L. E., Co., 98 Business St., Hyde Park 36, Mass.

Michigan Die Casting Co., 8651 E. 7 Mile Rd., Detroit 12.

Milwaukee Die Casting Co., 1015 N. 4th St., Milwaukee 3.

Monarch Aluminum Mfg. Co., Dycast Products Div., 9301 Detroit Ave., Cleveland.

Mt. Vernon Die Casting Corp., 118 Pearl St., Mount Vernon, N. Y.

National Lock Co., 1902 7th St., Rockford, Ill.

National Molded Products Co., 1130 E. 22nd St., Cleveland 17.

New Products Corp., 448 N. Shore Drive, Benton Harbor, Mich.

Newton-New Haven Co., New Haven 4, Conn.

Parker White Metal & Machine Co., McKinley Ave., Erie, Pa.

Phoenix Die Casting Co., 21 Illinois St., Buffalo.

Precision Castings Co., Inc., Fayetteville, N. Y.

Pressure Castings Inc., 21500 St. Clair Ave., Cleveland.

Rupert Diecasting Co., 1655 Cleveland Ave., Kansas City, Mo.

Shultz Die Casting Co., 1810 Clinton St., Toledo, Ohio.

Sterling Die Casting Co., 743 39th St., Brooklyn 32.

Superior Die Casting Co., 17325 Euclid Ave., Cleveland.

Toman, E., & Co., 2621 W. 21st Place, Chicago 8.

Twin City Die Castings Co., Talmadge and 33rd Ave., Minneapolis 14.

Warner Mfg. Co., 666 Hawthorne St., Glendale 4, Cal.

Western Die Casting Co., 4065 Hollis St., Emeryville 8, Cal.

Yale & Towne Mfg. Co., The, Henry St., Stamford, Conn.

Castings, Gray Iron

Alabama Foundry Co., Birmingham.

Alabama Pipe Co., McCoy St., Anniston, Ala.

Albany Car Wheel Co., P. O. Box 631 Albany 1, N. Y.

Albuquerque Foundry & Mach. Works, Albuquerque, N. M.

AMERICAN BRAKE SHOE CO., 230 Park Ave., New York 17.

American Brass & Iron Fdy Co., 7820 San Leandro St., Oakland 3, Calif.

American Car & Foundry Co., 30 Church St., New York 8.

American Cast Iron Foundry Co., Birmingham.

American Cast Iron Pipe Co., Birmingham.

American Hammered Piston Ring Div., Koppers Co., Bush St., Baltimore.

American Locomotive Co., Schenectady, N. Y.

American Marsh Pumps, Inc., 211 Capital Ave., Battle Creek, Mich.

Apex Steel Corp., Ltd., 6144 So. Eastern Ave., Los Angeles 22, Cal.

Arizona Iron Works, Phoenix, Ariz.

Arcade Manufacturing Div., Freeport, Ill.

Arkansas Foundry Co., Little Rock, Ark.

Atlas Foundry Co., Detroit.

Babcock & Wilcox Co., 85 Liberty St., New York 6.

BARTLETT-HAYWORD DIV., KOPPERS CO., 210 Scott St., Baltimore.

Beacon Steel Co., Front St., San Francisco 11, Cal.

Belle City Malleable Iron Co., Racine Steel Castings Co., Racine, Wis.

Bernard Foundry Co., 9 Roseland St., Springfield, Mass.

BERTSCH & CO., Cambridge City, Ind.

BETHLEHEM STEEL CO., Bethlehem, Pa.

Bingham & Taylor Corp., Howard St., Buffalo 6.

Binney Castings Co., Toledo, Ohio.

Blackhawk Foundry & Mach. Co., Davenport, Iowa.

Briggs-Shaffner Co., Brookstown Ave., Winston-Salem 2, N. C.

Buckeye Foundry Co., Beekman St., Cincinnati.

BULLARD CO., 280 Canfield Ave., Bridgeport 2, Conn.

Butler St. Foundry & Iron Co., Normal Ave., Chicago 16.

CARNEGIE-ILLINOIS STEEL CORP., Carnegie Bldg., 434 5th Ave., Pittsburgh 30.

Carondelet Foundry Co., S. Kings Highway, St. Louis 10.

Central Iron Foundry Co., 235 Orleans St., Detroit 7.

Centre Foundry & Machine Co., Wheeling, W. Va.

Chain Belt Co., 1755 W. Bruce St., Milwaukee 4.

CHAMBERSBURG ENGINEERING CO., Chambersburg, Pa.

Condenser Service & Engineering Co., Inc., 95 River Street, Hoboken, N. J.

Chicago Malleable Castings Co., 1220 W. 120th St., Chicago.

Cleveland Foundry Co., Harvard Ave., Cleveland 5.

Clow & Sons, James B., N. Talmen Ave., Chicago 12.

COOPER-BESSEMER CORP., 190 Thomas Ave., Mt. Vernon, Ohio.

CRAMP BRASS & IRON FOUNDRIES, 950 Simpson St., Eddystone, Pa.

Crane Co., 835 S. Michigan Ave., Chicago 5.

Crawford & Doherty Foundry Co., S. E. 17th Ave., Portland, Ore.

Davenport Besler Corp., 2313 Rockingham Road, Davenport, Ia.

De Laval Separator Co., 165 Broadway, New York 6.

Dobbi Foundry & Mach. Co., Niagara Falls, N. Y.

Duriron Co., Inc., Scott St., Dayton.

Eastern Malleable Iron Co., 1945 Brust St., Naugatuck, Conn.

Eimco Corp., 636 S. 4th St., Salt Lake City 8.

Elmira Foundry Co., Inc., Elmira, N. Y.

Empire Foundry, Larimer St., Denver 4.

Fairmount Foundry Co., Woonsocket, R. I.

FARREL-BIRMINGHAM CO., INC., 160 Maple St., Ansonia, Conn.

Ferrous Metal Corp., 36 W. 44th St., New York.

Flour City Ornamental Iron Co., 27th Ave., Minneapolis.

Forest City Foundries Co., 2500 W. 27th St., Cleveland 13.

Frank Foundries Corp., 21st St. & Second Ave., Moline, Ill.

Fulton Foundry & Mach. Co., E. 75th St., Cleveland.

Galli Foundry, N. Park St., Reno, Nev.

Gilhams, H. S., & Co., 2312 Lincoln Liberty Bldg., Philadelphia 7.

Gray & Dudley Co., Clifton Rd., Nashville, Tenn.

Griffin Wheel Co., So. 12th St., Kansas City, Kan.

Grimm Foundry Co., Inc., Bound Brook, N. J.

Grinnell Company, Inc., 260 West Exchange St., Providence 1.

Gunite Foundries Corp., Rutz Ave., Rockford, Ill.

Hamilton Foundry & Mach. Co., Hamilton, Ohio.

Harper Foundry & Machine Co., Jackson, Miss.

Hassell Engineering Co., 500 S. Sahwatch St., Colorado Springs, Colo.

HILL ACME CO., 6400 Breakwater Ave. N.W., Cleveland 2.

Hunt-Spiller Mfg. Corp., Dorchester Ave., Boston.

International Harvester Co., Canton, Ill.

JEFFREY MFG. CO., 925 No. 4th St., Columbus 16.

Kaiser Co., Inc., Fontana, Cal.

KAUKAUNA MACHINE CORP., Kaukauna, Wis.

King Plow Co., 890 W. Marietta St., Atlanta 1.

Knowles, F. S., 77 W. Washington St., Chicago 2.

LAKE CITY MALLEABLE CO., 5055 Lakeside Ave., Cleveland.

Lake Shore Engineering Co., Iron Mountain, Mich.

Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Little Bros. Foundry Co., Connor St., Port Huron, Mich.

Little Giant Co., 130 Rock St., Mankato, Minn.

Lobdell Co., P. O. Box 1108, Wilmington 99, Del.

Love Bros. Inc., Aurora, Ill.

MACKINTOSH HEMPHILL CO., 901 Binghamton St., Pittsburgh 3.

Mahr Mfg. Co., Div. Diamond Iron Works, 1729 No. 2nd St., Minneapolis 11.

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Manchester Foundry Co., Manchester, N. H.

Mechanite Research Institute, Pershing Sq. Bldg., New Rochelle, N. Y.

Minot Foundry Co., Minot, N. D.

Mir-O-Col Alloy Co., 2414 E. 53rd St., Los Angeles 11.

Montana Iron Works, Inc., Butte, Mont.

Motor Castings Co., 1323 S. 65th St., West Allis, Wis.

National Radiator Co., Crouse St., Johnstown, Pa.

Newark Brass Fdy. Co., Kearny, N. J.

North American Aviation, Inc., Inglewood, Cal.

North Brothers Mfg. Co., Lehigh Ave. & American St., Philadelphia 33.

Ogden Iron Works Co., Ogden, Utah.

Oliver Machinery Co., 1025 Clancy St., Grand Rapids 2, Mich.

CHARLES PARKER CO., Meriden, Conn.

Paxton-Mitchell Co., Martha St., Omaha, Neb.

Pearch Foundry & Mach. Works, Inc., Baton Rouge, La.

Penn Foundry Co., Box 112, Reading, Pa.

Perfect Circle Co., Stout St., Hagerstown, Ind.

Pittsburgh Foundry & Mach. Co., 36th St., Pittsburgh 1.

Portland Co., The, Fore St., Portland 6, Me.

Ralston Steel Car Co., E. 4th Ave., Columbus 16, Ohio.

Ramsey Chain Co., Inc., Troy Rd., Albany 1.

Red Jacket Mfg. Co., Davenport, Iowa.

REPUBLIC STEEL CORP., 1400 Republic Bldg., Cleveland 1.

Royersford Foundry & Machine Co., Inc., Main St., Royersford, Pa.

Ridgway & Son Co., Craig, Coatesville, Pa.

Russell Foundry Co., Alexander City, Ala.

Saco-Lowell Shops, 60 Batterymarch St., Boston 10.

Saginaw Malleable Iron Div., General Motors Corp., Florence St., Saginaw, Mich.

Salmon Bay Foundry Co., Inc., 24th Ave., Seattle.

Sargent & Co., Water St., New Haven 9, Conn.

Seamless Foundry Co., Meadow St., Philadelphia 48.

SKF INDUSTRIES, INC., Front St. & Erie Ave., Philadelphia 34.

SHENANGO PENN MOLD CO., 1940 W. 3rd St., Dover, Ohio.

Taylor & Co., Inc., Morgan Ave., Brooklyn 22.

Taylor & Fenn Co., Arch St., Hartford 1.

Texas Foundry & Mach. Co., S. Fleming St., Dallas, Tex.

Textile Machine Works, Reading, Pa.

Union Iron Works Co., 1760 Columbia Rd., Washington 9, D. C.

Union Machine Co., Bartlesville, Okla.

Universal Foundry Co., Oshkosh, Wis.

Vogt Machine Co., Henry W., Ormsby St., Louisville 10.

Western Foundry Co., 3634 S. Kedzie Ave., Chicago 32.

Williams, White & Co., 8th St. & Third Ave., Moline, Ill.

WOOD, R. D., CO., Conshohocken, Pa.

Youngstown Foundry & Machine Co., P. O. Box 539, Youngstown 1.

Castings, Magnesium

Advance Pressure Castings, Inc., 34 N. 15th St., Brooklyn 22.

AMERICAN MAGNESIUM CORP., 2210 Harvard Ave., Cleveland.

Borman Castings Corp., St. Joseph, Mich.

DOEHLER-JARVIS CORP., 386 4th Ave., New York.

Dow Chemical Co., The, Midland, Mich.

HARVILL CORP., 6251 Century Blvd., Los Angeles, 43.

New Products Corp., 448 North Shore Drive, Benton Harbor, Mich.

Newton-New Haven Co., New Haven 4, Conn.

Precision Castings Co., Inc., Fayetteville, N. Y.

Western Die Casting Co., 4065 Hollis St., Emeryville 8, Cal.

Wood, J. R., Products Corp., 70 Washington St., Brooklyn 1, N. Y.

Castings, Malleable Iron

Acme Steel & Malleable Iron Works, Inc., 245 Military Road, Buffalo 7.

Albany Castings Co., Inc., Voorheesville, N. Y.

Albion Malleable Iron Co., Albion, Mich.

AMERICAN CHAIN & CABLE CO., INC., 520 Michigan Ave., Chicago 11. (Malleable Castings Dept.)

American Malleable Castings Co., Marion, Ohio.

American Radiator Co., Malleable Iron Dept., Buffalo.

Arcade Malleable Iron Co., Inc., Nebraska & Muskeego Sts., Worcester, Mass.

Ashland Malleable Co., Ashland, Ohio.

Auto Specialties Mfg. Co., St. Joseph, Mich.

Badger Malleable & Mfg. Co., S. Milwaukee, Wis.

Baltimore Malleable Iron & Steel Casting Co., Charles & Wells Sts., Baltimore.

Belcher Malleable Iron Co., Easton, Mass.

Belle City Malleable Iron Co., Forest & Kewaunee Sts., Racine, Wis.

Benton Harbor Malleable Industries, Benton Harbor, Mich.

Cadillac Malleable Iron Co., 1010 W. Third St., Cadillac, Mich.

Canton Malleable Iron Co., 2409 13th St., N.E., Canton 5, Ohio.

Carbon Malleable Casting Co., 728 S. Prince St., Lancaster, Pa.

Chain Belt Co., 4800 W. Mitchell St., Milwaukee 14.

Chicago Malleable Castings Co., 1225 W. 120th St., West Pullman, Chicago.

Columbia Malleable Castings Corp., 1400 Lincoln Highway, Columbia, Pa.

Columbus Malleable Iron Co., 762 Curtis Ave., Columbus 3, Ohio.

Connecticut Malleable Castings Co., New Haven, Conn.

Crane Co., 836 S. Michigan Ave., Chicago 5.

Dalton Foundries, Inc., Warsaw, Ind.

Dayton Malleable Iron Co., Dayton.

Detroit Brass & Malleable Works, Campbell at Watson, Detroit.

Eastern Malleable Iron Co., Naugatuck, Conn.

Erie Malleable Iron Co., 680 W. 12th St., Erie, Pa.

Fanner Mfg. Co., Brookside Park & Blvd., Cleveland.

Federal **Malleable Co.**, 805 So. 72nd St., West Allis, Wis.

Flagg, Stanley G., & Co., Inc., 1432 Chestnut St., Philadelphia.

Fort Pitt Malleable Iron Co., Box 1054, Pittsburgh.

Frazer & Jones Co., Milton Ave., Syracuse, N. Y.

GENERAL ELECTRIC CO., Erie, Pa.

General Malleable Corp., 723 E. Main St., Waukesha, Wis.

General Metals Corp., Los Angeles.

Gilhams & Co., H. S., 2312 Lincoln Liberty Bldg., Philadelphia 7.

Grabler Mfg. Co., 6565 Broadway S. E., Cleveland.

Grinnell Company, Inc., 260 West Exchange St., Providence 1.

Gunite Foundries Corp., Rockford, Ill.

Haven Malleable Castings Co., Dane & Knowlton Sts., Cincinnati.

Illinois Malleable Iron Co., 1805 W. Diversey Parkway, Chicago.

International Harvester Co., 180 N. Michigan Ave., Chicago 14.

Iowa Malleable Iron Co., Fairfield, Iowa.

James Mfg. Co., Fort Atkinson, Wis.

Jamestown Malleable Iron Corp., Tiffany Ave., Jamestown, N. Y.

Jarecki Mfg. Co., 13th & Chestnut Sts., Erie, Pa.

JEFFREY MFG. CO., THE, 925 No. 4th St., Columbus 16.

Jewell Alloy & Malleable Co., Inc., 385 Hertel Ave., Buffalo.

Kennedy Valve Mfg. Co., Elmira, N. Y.

Kirsh Foundry Co., Beaver Dam, Wis.

Kokomo Malleable Iron Works, Kokomo, Ind.

Laconia Malleable Iron Co., Laconia, N. H.

LAKE CITY MALLEABLE CO., 5046 Lakeside Ave., Cleveland 14.

Lakeside Malleable Castings Co., Racine, Wis.

Lancaster Malleable Castings Co., Lancaster, Pa.

Lancaster Malleable & Steel Corp., Lancaster, New York.

LEHIGH FOUNDRIES, INC., Easton, Pa.

Link-Belt Co., 307 N. Michigan Ave., Indianapolis.

Malleable Iron Fittings Co., Branford, Conn.

Malleable Iron Range Co., Beaver Dam, Wis.

Marion Malleable Iron Works, Marion, Ind.

Massey-Harris Co., Inc., Batavia, N. Y.

Maumee Malleable Castings Co., Toledo, Ohio.

Meadville Malleable Iron Co., Meadville, Pa.

Meeker Foundry Co., Newark, N. J.

Michigan Malleable Iron Co., 7740 Gould St., Detroit.

Milwaukee Malleable & Grey Iron Works, 725 S. Second St., Milwaukee 4.

Moline Iron Works, Moline, Ill.

Moline Malleable Iron Co., St. Charles, Ill.

Muncie Malleable Foundry Co., Muncie, Ind.

National Malleable & Steel Castings Co., 10600 Quincy Ave., Cleveland.

Newark Malleable Iron Works, 357 Wilson Ave., Newark, N. J.

North & Judd Mfg. Co., New Britain, Conn.

Northern Malleable Iron Co., 867 Forest St., St. Paul.

Ohio Brass Co., 100 Surrey Road, Mansfield, Ohio.

Ohio Malleable Iron Co., 1345 Fields Ave., Columbus 1, Ohio.

Oriskany Malleable Iron Co., Oriskany, N. Y.

PEORIA MALLEABLE CASTINGS CO., Alexander & Averyole Sts., Peoria 1, Ill.

Pratt, William E., Mfg. Co., Joliet, Ill.

Rhode Island Malleable Iron Works, Hillsgrove, R. I.

Richmond Malleable Castings Co., Richmond, Ind.

Saginaw Malleable Iron Div., (General Motors Corp.), Bassett & Florence Sts., Saginaw, Mich.

St. Louis Malleable Casting Co., 7701 N. Conduit Ave., St. Louis.

Stockham Pipe Fittings Co., 4100 10th Ave., Birmingham.

Superior Steel & Malleable Castings Co., Benton Harbor, Mich.

Symington-Gould Corp., 3343 Lusink St., Rochester, N. Y.

Terra Haute Malleable & Mfg. Corp., Terre Haute, Ind.

Texas Foundries, Inc., Lufkin, Texas.

Union Malleable Iron Co., East Moline, Ill.

Vermilion Malleable Iron Works, (Poor & Co.), Hoopeston, Ill.

Wagner Malleable Iron Co., Decatur, Ill.

Walworth Co., 60 E. 42nd St., New York 17.

Webster Mfg. Co., Inc., Hale St., Tiffin, Ohio.

West Virginia Malleable Iron Co., Point Pleasant, W. Va.

Western Foundry Co., 3634 S. Kedzie Ave., Chicago 32.

Wisconsin Appleton Co., S. Milwaukee, Wis.

Castings, Manganese Steel

AMERICAN MANGANESE STEEL DIV., AMERICAN BRAKE SHOE CO., 375 E. 14th St., Chicago Heights, Ill.

Babcock & Wilcox Co., 85 Liberty St., New York.

BETHLEHEM STEEL CO., Bethlehem, Pa.

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

National Supply Co., Grant Bldg., Pittsburgh.

Pettibone-Mulliken Corp., 4700 W. Division St., Chicago 51.

TAYLOR-WHARTON IRON & STEEL CO., High Bridge, N. J.

Washington Iron Works, S. 6th Ave., Seattle.

Castings, Meehanite

AMERICAN BRAKE SHOE CO., 230 Park Ave., New York 17.

FARREL-BIRMINGHAM CO., INC., Ansonia, Conn.

Gilhams, H. S., & Co., 2312 Lincoln Liberty Bldg., Philadelphia 7.

Mahr Mfg. Co., Div. Diamond Iron Works, 1729 No. 2nd St., Minneapolis 11.

MEEHANITE METAL CORP., Pershing Square Bldg., New Rochelle, N. Y.

Ross-Meehan Foundries, P. O. Box 1258, Chattanooga 1, Tenn.

WOOD, R. D., COMPANY, Conshohocken, Pa.

Castings, Nickel and Nickel Alloys

INTERNATIONAL NICKEL CO., INC., 67 Wall St., New York 5.

Metal & Alloy Specialties Co., Inc., 1900 Elmwood Ave., Buffalo.

SHENANGO-PENN MOLD CO., Dover, Ohio.

Union Spring & Mfg. Co., New Kensington, Pa.

Castings, Nonferrous (See Also Specific Types)

ALUMINUM INDUSTRIES, INC., Beekman St., Cincinnati 25.

CRAMP BRASS & IRON FOUNDERS DIV., BALDWIN LOCOMOTIVE WORKS, Simpson St., Eddystone, Pa.

NATIONAL BEARING DIV., AMERICAN BRAKE SHOE CO., 4930 Manchester Ave., St. Louis 10.

ROTO-MET CENTRIFUGAL CASTINGS CO., 4300 W. Monarch Place, Milwaukee 8, Wis.

SHENANGO-PENN MOLD CO., Dover, Ohio.

UTICA RADIATOR CORP., 2201 Dwyer Ave., Utica 2, N. Y.

Castings, Oil-Hardening Tool Steel, Cast to Shape

ALLEGHENY LUDLUM STEEL CORP., FORGING & CASTING DIV., Ferndale 20, Mich.

Gorham Tool Co., Woodrow Wilson Ave., Detroit.

Hoyland Steel Co., 405 Lexington Ave., New York 17.

JESSOP STEEL CO., Washington, Pa.

Castings, Precision Equipment (See Precision Casting Equipment)

Castings, Precision Investment

Ace Manufacturing Corp., 1237 E. Erie Ave., Philadelphia 24.

ALLEGHENY LUDLUM STEEL CORP., FORGING & CASTING DIV., Ferndale 20, Mich.

ALLIS-CHALMERS MFG. CO., 1126 So. 70th St., Milwaukee 1.

Cerro De Pasco Copper Corp., 40 Wall St., New York 5.

Crucible Steel Co., 405 Lexington Ave., New York 17.

General Refineries Inc., 27 N. 4th St., Minneapolis 1, Minn.

Illinois Precise Casting Co., 613 W. 16th St., Chicago 16.

INTERNATIONAL NICKEL CO., INC., 67 Wall St., New York 5.

National Aluminate Corp., 6229 West 66th Place, Chicago 38.

Wood, J. R., Products Corp., 70 Washington St., Brooklyn.

Castings, Pressure

Burnside Steel Foundry Co., 1300 E. 92nd St., Chicago 19.

Commerce Pattern Foundry & Machine Co., 7450 Melville at Green, Detroit 17.

Condenser Service & Engineering Co., Inc., 95 River St., Hoboken, N. J.

CONTINENTAL FOUNDRY & MACH. CO., Grant Bldg., Pittsburgh 19.

DODGE STEEL CO., 6501 State Rd., Tacony, Phila. 35.

Empire Steel Castings, Inc., Box 139, Reading, Pa.

Farrell-Cheek Steel Co., Sandusky, Ohio.

Frank Foundries Corp., 21st St. & Second Ave., Moline, Ill.

Gilhams, H. S., & Co., 2312 Lincoln Liberty Bldg., Philadelphia 7.

Lumen Bearing Co., 197 Lathrop St., Buffalo 12.

PITTSBURGH STEEL FOUNDRY CORP., Glassport, Pa.

Ross-Meehan Foundries, P. O. Box 1258, Chattanooga, Tenn.

Sivyer Steel Castings Co., 1675 S. 43rd St., Milwaukee 14.

TITAN METAL MFG. CO., Bellefonte, Center Co., Pa.

Western Foundry Co., 3634 S. Kedzie Ave., Chicago 32.

WOOD, R. D., COMPANY, Conshohocken, Pa.

Castings, Refractory Material

Corhart Refractories Co., Inc., 1600 W. Lee St., Louisville 10.

Castings, Semisteel

American Car & Foundry Co., 30 Church St., New York 8.

BETHLEHEM STEEL CO., Bethlehem, Pa.

BLAW-KNOX CO., Farmers Bank Bldg., Pittsburgh.

Bonnot Co., 722 Mulberry Rd. S. E., Canton 2, Ohio.

Centre Foundry & Machine Co., Wheeling, W. Va.

Chain Belt Co., 1755 W. Bruce St., Milwaukee 4.

Condenser Service & Engineering Co., Inc., 95 River St., Hoboken, N. J.

FARREL-BIRMINGHAM CO., INC., Ansonia, Conn.

Forest City Foundries Co., 2500 W. 27th St., Cleveland 13.

Frank Foundries Corp., 21st St. & Second Ave., Moline, Ill.

Gilhams, H. S., & Co., 2312 Lincoln Liberty Bldg., Philadelphia 7.

HILL ACME CO., 6400 Breakwater Ave. N. W., Cleveland 2.

Knowles, F. S., 77 W. Washington St., Suite 1702, Chicago 2.

Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40.

Oliver Machinery Co., 1025 Clancy St., Grand Rapids 2.

Penn Foundry Co., Box 112, Reading, Pa.

Ross-Meehan Foundries, P. O. Box 1258, Chattanooga, Tenn.

Textile Machine Works, Reading, Pa.

Universal Foundry Co., Oshkosh, Wis.

Western Foundry Co., 3634 S. Kedzie Ave., Chicago 32.

WOOD, R. D., Co., Conshohocken, Pa.

Castings, Special Steel

ALLEGHANY LUDLUM STEEL CORP., FORGING & CASTING DIV., Ferndale 20, Mich.

Alloy Casting Co., Victor Ave.,

American Cast Iron Pipe Co., Champaign, Ill.

American Cast Iron Pipe Co., Birmingham.

AMERICAN MANGANESE STEEL DIV., AMERICAN BRAKE SHOE CO., E. 14th St., Chicago Heights, Ill.

American Steel Castings Co., Avenue L, Newark 1, N. J.

American Steel Foundries, N. Michigan Ave., Chicago.

Atlas Foundry Co., Irvington, N. J.

Babcock & Wilcox Co., 85 Liberty St., New York.

Belle City Malleable Iron Co., Forest Ave., Racine, Wis.

BETHLEHEM STEEL CO., Bethlehem, Pa.

BIRDSBORO STEEL FOUNDRY & MACHINE CO., Birdsboro, Pa.

Boker & Co., H., Inc., 101 Duane St., New York 8.

Buflovak Equipment Div. of Blaw-Knox Co., Winchester Ave., Buffalo.

Campbell, Wyant & Cannon Foundry Co., Henry St., Muskegon, Mich.

Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh 30.

Chicago Steel Foundry Co., W. 37th St., Chicago.

Cooper-Bessemer Corp., Mt. Vernon, Ohio.

• Every company in the metalworking industry is urged to check this section of the new IRON AGE Metalworking Buyers' Guide, and send in corrections and additions to assure complete accuracy in the first reprint of the directory. Forward corrections to THE IRON AGE, Attention Buyers' Directory, 100 E. 42nd St. New York 17.

CRUCIBLE STEEL CASTING CO., Landsdowne, Pa.

Detroit Steel Casting Co., Michigan Ave., Detroit.

DODGE STEEL CO., Philadelphia.

Duriron Co., Inc., Dayton.

Eastern Malleable Iron Co., Naugatuck, Conn.

Electric Steel Castings Co., Indianapolis.

FORT PITT STEEL CASTING DIV., H. K. Porter Co., McKeesport, Pa.

General Steel Castings Corp., Eddystone, Pa.

Goslin-Birmingham Mfg. Co., Tenth Ave., Birmingham.

Grede Foundries, Inc., Milwaukee.

Gunite Foundries, Inc., Rockford, Ill.

Hunt-Spiller Mfg. Corp., Boston.

Hyde Park Foundry & Machine Co., Hyde Park, Pa.

Lebanon Steel Foundry, Lebanon, Pa.

MACKINTOSH-HEMPHILL CO., Pittsburgh.

Michigan Steel Casting Co., Detroit.

Midvale Co., Philadelphia.

NATIONAL ALLOY STEEL DIV. OF BLAW-KNOX CO., Blawnox, Pa.

NATIONAL-ERIE CORP., Erie, Pa.

OHIO STEEL FOUNDRY CO., Lima, Ohio.

Racine Steel Castings Co., Forest Ave., Racine, Wis.

Reading Steel Casting Div., Amer. Chain & Cable Co., Inc., Reading, Pa.

Sivyer Steel Casting Co., Milwaukee.

STANDARD STEEL WORKS DIV., BALDWIN LOCOMOTIVE WORKS, Burnham, Pa.

Symington-Gould Corp., Rochester, N. Y.

TAYLOR-WHARTON IRON & STEEL CO., High Bridge, N. J.

Treadwell Engineering Co., Easton, Pa.

Union Steel Castings Div., Pittsburgh.

UNITED ENGINEERING & FOUNDRY CO., First Nat'l Bank Bldg., Pittsburgh.

Castings, Stainless Steel

ALLEGHENY LUDLUM STEEL CORP., Brackenridge, Pa.

Alloy Casting Co., Victor Ave., Champaign, Ill.

American Steel Castings Co., Herbert and Ave L, Newark 1.

Chicago Steel Foundry Co., Kedzie Ave. & 37th St., Chicago 32.

Duraloy Co., Pittsburgh.

Duriron Co., Inc., Dayton.

Grede Foundries, Inc., 1400 First St., Milwaukee 1.

Michigan Steel Casting Co., Guoin St., Detroit 7.

RYERSON, J. T., & SON, INC., Box 8000, Chicago.

Solar Aircraft Co., San Diego.

Walz & Krenzer, Inc., 250 Mount Hope Ave., Rochester 7, N. Y.

Castings, Steel

AMERICAN BRAKE SHOE CO., 230 Park Ave., New York 17.

AMERICAN MANGANESE STEEL DIV., AMERICAN BRAKE SHOE CO., 375 E. 14th St., Chicago Heights, Ill.

Belle City Malleable Iron Co., Racine Steel Castings Co., Racine, Wis.

BETHLEHEM STEEL CO., Bethlehem, Pa.

Blaw-Knox Co., Pittsburgh.

Burnside Steel Foundry Co., 1300 E. 92nd St., Chicago 19.

Calumet Steel Castings Corp., 1636 Summer St., Hammond, Ind.

CARNEGIE-ILLINOIS STEEL CORP., Carnegie Bldg., Pittsburgh 30.

Chicago Malleable Castings Co., 1225 W. 120th St., Chicago 43.

Chicago Steel Foundry Co., Kedzie Ave. & 37th St., Chicago 32.

Columbia Steel Co., Russ Bldg., San Francisco 6.

CONTINENTAL FOUNDRY & MACH. CO., Grant Bldg., Pittsburgh 19.

DODGE STEEL CO., 6581 State Rd., Tacony, Philadelphia 35.

Eimco Corp., 636 S. 4th St., Salt Lake City 8.

Empire Steel Castings, Inc., Box 139, Reading, Pa.

FARREL-BIRMINGHAM CO., INC., 344 Vulcan St., Buffalo 7, N. Y.

Farrell-Cheek Steel Co., Sandusky, Ohio.

H. S. Gilhams & Co., 2312 Lincoln Liberty Bldg., Philadelphia 7.

Hartford Electric Steel Corp., 540 Flatbush Ave., Hartford 6.

JESSOP STEEL CO., Washington, Pa.

F. S. Knowles, 77 W. Washington St., Suite 1702, Chicago 2.

LEBANON STEEL FOUNDRY, Lebanon, Pa.

Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Machined Steel Casting Co., Alliance, Ohio.

MACKINTOSH HEMPHILL CO., 901 Binghamton St., Pittsburgh 3.

Maynard Electric Steel Castings Co., 2856 S. 27th St., Milwaukee 7.

National Malleable & Steel Castings Co., Quincy & Baldwin Rd., Cleveland.

OHIO STEEL FOUNDRY CO., Lima, Ohio.

Otis Elevator Co., 260 11th Ave., New York 1.

PITTSBURGH STEEL FOUNDRY CORP., Glassport, Pa.

Ross-Meehan Foundries, P. O. Box 1258, Chattanooga 1, Tenn.

Sivyer Steel Castings Co., 1675 S. 43rd St., Milwaukee 14.

SKF INDUSTRIES, INC., Front St. & Erie Ave., Philadelphia 32.

Strong Steel Foundry Co., 33 Norris St., Buffalo 7.

Tonawanda Electric Steel Casting Corp., 5 Mechanic St., N. Tonawanda, N. Y.

Vulcan Iron Works, Wilkes-Barre, Pa.

Western Foundry Co., 3634 S. Kedzie Ave., Chicago 32.

Casting Washers

Colson Corp., Cedar St., Elyria, Ohio.

Frank Foundries Corp., 21st St. & Second Ave., Moline, Ill.

Western Foundry Co., 3634 S. Kedzie Ave., Chicago 32.

Casting Wax, Investment

Bakelite Corp., 300 Madison Ave., New York 17.

Kerr Dental Mfg. Co., Detroit.

ALEX SAUNDERS & CO., 95 Bedford St., New York 14.

Cast Iron Welding Rods

(See Welding Rods, Cast Iron)

Cement, Acid Proof

Beals, McCarthy & Rogers, Inc., (Distributors), 50 Terrace, Buffalo 5.

CEILCOTE CO., 750 Rockefeller Bldg., Cleveland 13.

Custodis Construction Co., Inc., 80 Broad St., New York 4.

E. I. DU PONT DE NEMOURS & CO., INC., Explosives Dept., Wilmington 98, Del.

Frederic B. Stevens, Inc., 510 Third St., Detroit 26.

FLEXROCK CO., 36th & Filbert Sts., Philadelphia 4.
Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland 11.
NATIONAL CARBON CO., INC., 30 E. 42nd St., New York 17.
NATIONAL LEAD CO., 111 Broadway, New York 6, N. Y.
NUKEM PRODUCTS CORP., Buffalo 20.
PENNSYLVANIA SALT MFG. CO., 1000 Widener Bldg., Philadelphia 7.
Quigley Co., Inc., 527 Fifth Ave., New York 17.
Tremco Mfg. Co., 8710 Kinsman Rd., Cleveland 4.
U. S. STONEWARE CO., Process Eqpt. Div., P. O. Box 350, Akron, Ohio.

Cement Brushes

Beals, McCarthy & Rogers, Inc., (Distributors), 50 Terrace, Buffalo 5.
Manderscheid Co., 810 Fulton St., Chicago 7.
PITTSBURGH PLATE GLASS CO., Paint Div., Grant Bldg., Pittsburgh 19.

Cement, Polishing

Allied Industrial Products Co., 620 North Michigan Ave., Chicago 11.
Beam-Knodel Co., 195 Lafayette St., New York 12.
Formax Mfg. Co., 3000 Bellevue St., Detroit 7.
Harrison & Co., P. O. Box 457, Haverhill, Mass.
M. P. Iding Disc Grinding Compound Co., 3530 W. Pierce St., Milwaukee 4.
Manderscheid Co., 810 Fulton St., Chicago 7.
PARK CHEMICAL CO., 8088 Military Ave., Detroit 4.
Sommers Bros. Mfg. Co., 3439-41-43 No. Broadway, St. Louis 7.
U. S. Grinding Wheel Co., 180 Lafayette St., New York 13.

Cement, Refractory

BASIC REFRACTORIES, INC., Hanna Bldg., Cleveland.
BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.
Beals, McCarthy & Rogers, Inc. (Distributor), 50 Terrace, Buffalo 5.
Botfield Refractories Co., Swanson & Clymer Sts., Philadelphia 47.
CARBORUNDUM CO., FERROCARBO DIV., Niagara Falls, N. Y.
Chas. Taylor Sons Co., 706 Burns St., Cincinnati 14.
Cleveland Tool & Supply Co., 1427 W. 6th St., Cleveland 13.
Climax Fire Brick Co., Climax, Pa.
Egan, Webster & Co., Inc., Koppers Bldg., Pittsburgh 19.
ELECTRO REFRACTORIES & ALLOYS CORP., 344 Delaware Ave., Buffalo 2.
Foote Mineral Co., 12 E. Chelten Ave., Philadelphia 44.
Frederic B. Stevens, Inc. (Distributor), 510 Third St., Detroit 26.
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NATIONAL CARBON CO., INC., 30 E. 42nd St., New York 17.
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TITANIUM ALLOY MFG. CO., Box C, Bridge Sta., Niagara Falls, N. Y.

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Chrysler Corp., Cycleweld Div., Detroit.
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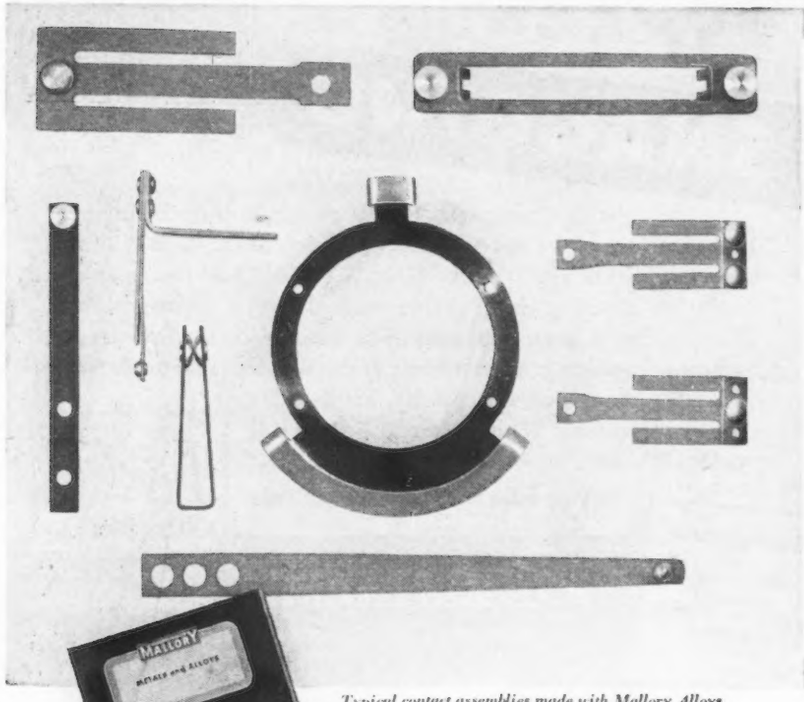

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